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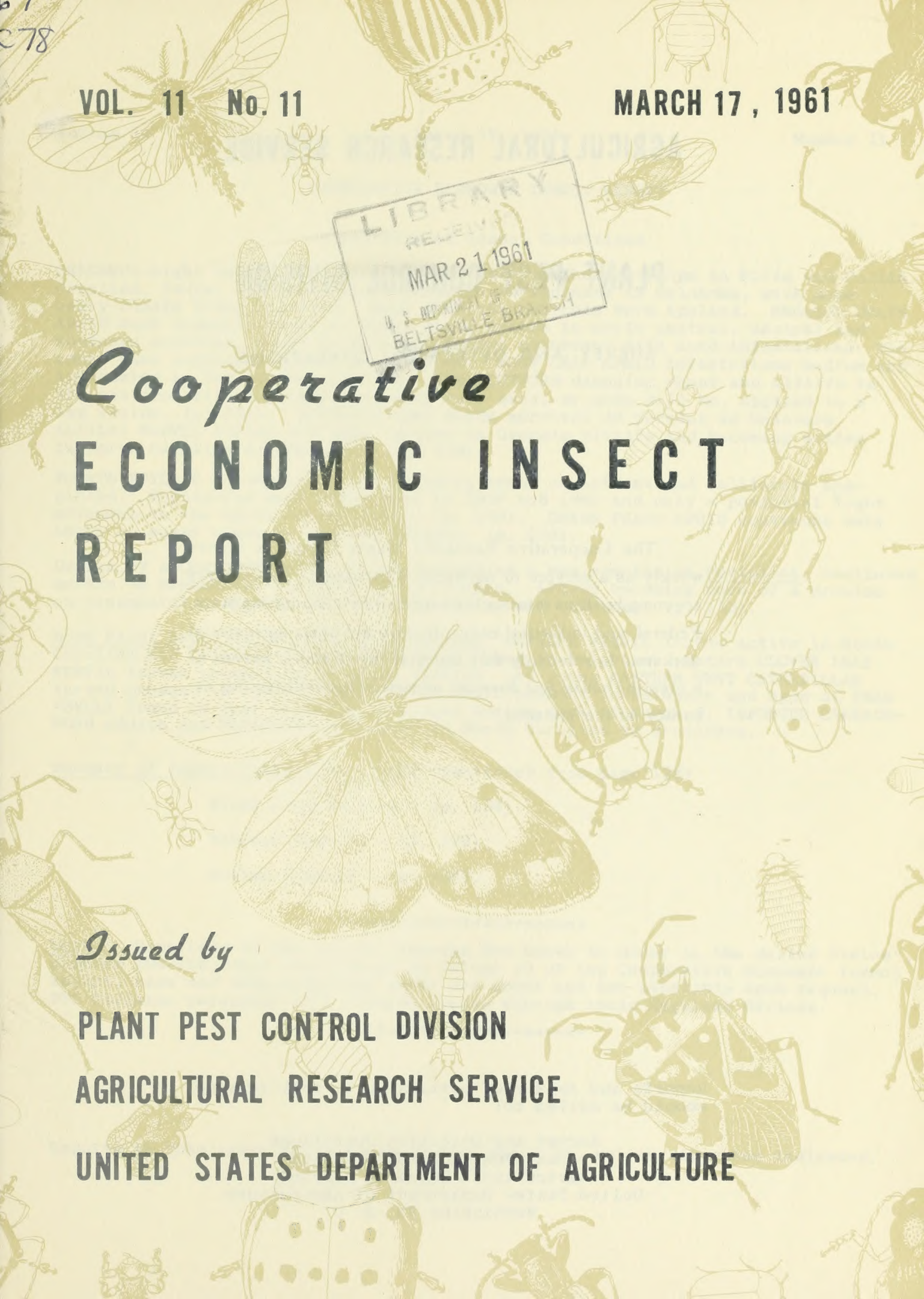

VOL. 11 No. 11

MARCH 17, 1961

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Cooperative
ECONOMIC INSECT REPORT

Issued by

PLANT PEST CONTROL DIVISION
AGRICULTURAL RESEARCH SERVICE
UNITED STATES DEPARTMENT OF AGRICULTURE

AGRICULTURAL RESEARCH SERVICE

PLANT PEST CONTROL DIVISION

SURVEY AND DETECTION OPERATIONS

The Cooperative Economic Insect Report is issued weekly as a service to American Agriculture. Its contents are compiled from information supplied by cooperating State, Federal, and industrial entomologists and other agricultural workers. In releasing this material the Division serves as a clearing house and does not assume responsibility for accuracy of the material.

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Survey and Detection Operations
Plant Pest Control Division
Agricultural Research Service
United States Department of Agriculture
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Volume 11 March 17, 1961 Number 11

COOPERATIVE ECONOMIC INSECT REPORT

Highlights of Insect Conditions

GREENBUG might become a problem if favorable weather develops in Ellis and Collin Counties, Texas; and populations continue to increase in Oklahoma, with some heavy counts being reported. Some chemical controls were applied. ENGLISH GRAIN APHID most commonly found in Texas small grains in north central, central and southern counties; wheat growers may become concerned with head infestations. The aphid also continues common in Oklahoma. CORN LEAF APHID infestations medium and increasing in barley over Arizona. ARMY CUTWORM damaging wheat and alfalfa in the western half of Kansas; controls have been, or soon will be, applied to a few fields. (p. 151). EUROPEAN CORN BORER survival 46 percent in Delaware. ALFALFA WEEVIL larvae continue active in Georgia alfalfa and becoming active in North Carolina and Delaware. (p. 152).

POTATO PSYLLID survey in spring breeding areas of Arizona and California completed. Population much lower than in 1959 and 1960 and only a potential light movement to the north is indicated. (p. 153). GREEN PEACH APHID continues very heavy on sugar beets in central Arizona. (p. 154).

Damage by a COSMOPTERYGID, now determined as a new species of Periploca, continues severe on ornamental junipers in California. APHIDS becoming more of a problem on ornamental plants in Arizona, New Mexico and Oklahoma. (p. 155).

Some First Reported Records of the Season: ALFALFA WEEVIL larvae active in North Carolina and Delaware; some adults also noted in Delaware. Mature CLOVER LEAF WEEVIL larvae present in Delaware alfalfa and young EASTERN TENT CATERPILLAR larvae present in Texas. GREEN PEACH APHID present in Delaware and eggs of PEAR PSYLLA found in pear orchards in Oregon during week of March 5. IMPORTED CABBAGEWORM adults and HARLEQUIN BUG noted in North Carolina on crucifers.

Summary of Insect Conditions - 1960 (continued from page 138)

Truck Crop Insects - (p. 159).

Tobacco Insects - (p. 179).

Cotton Insects - (p. 180).

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NOTE - Separates of the series "Insects Not Known to Occur in the United States", numbers 106-128, that were issued in Volume 10 of the Cooperative Economic Insect Report, have now been assembled under one cover and are available upon request. PPC Division personnel will receive copies through their Regional Offices.

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Reports in this issue are for week ending March 10, unless otherwise indicated.

WEATHER OF THE WEEK ENDING MARCH 13

This week was several degrees cooler than last week east of the Rocky Mountains, but temperatures still averaged well above normal, except about 2° to 4° below normal in New York State and New England. In the Far West, average temperatures for the week ranged within 3° of the seasonal normals. Freezing extended into the Winter Garden area of Texas on the 9th, and scattered light to moderate frost occurred as far south as the Florida Everglades on the 10th. Little or no damage was reported.

Several storm systems during the week produced high winds and rather widespread precipitation. Precipitation, much of which was in the form of snow in the northern areas, occurred almost daily in much of the Pacific Northwest, on 4 to 5 days east of the Great Plains, and on 1 or 2 days in the Great Plains and far western Interior. Weekly totals ranged from 1 to over 2 inches in western Washington and Oregon and in the Sierra Nevada Mountains and northern sections of California, and in the Midwest. Flooding was reported along the Wabash and Ohio Rivers and along streams in several other states.

Much precipitation was in the form of snow and sleet in northern and mountainous sections. During the first few days of the period snowfall was heavy in a rather narrow belt extending from the central Rockies to the Great Lakes. More than 3 feet was reported in some mountain areas of northern Utah. Falls ranging up to 15 inches or more were drifted by high winds in Iowa and Wisconsin. In the latter State, 8-foot drifts were reported. Frequent snowfall in the Northeast, from the 6th to the 10th, totaled 10 to 20 inches in northern Maine. At Lenox, Massachusetts, heavy snow on the 9th caused the roof of the Tanglewood Concert Hall to collapse. At the end of the week, the snow cover extended southward to northern Pennsylvania, southern portions of Michigan, Wisconsin, Minnesota, and northern Iowa.

Many severe local storms occurred during periods of heavy precipitation in the Midcontinent area. Several tornadoes, occurring in Missouri and Arkansas on the 12th, were responsible for one death, many injuries, and heavy property losses. On the 6th a storm, believed to be a tornado, killed 3 persons and destroyed 2 homes about 45 miles northeast of Memphis, Tennessee. (Summary supplied by U. S. Weather Bureau).

CEREAL AND FORAGE INSECTS

GREENBUG (Toxoptera graminum) - TEXAS - Survey of 25 north central, central and southern counties revealed very low or no infestations; heaviest found in experimental plots at Beeville (5-10 per foot) and at College Station (up to 25 per foot). (Chada). Light, widespread infestations in Ellis and Collin Counties; no economic damage yet, but might become problem if favorable weather develops. (Davis). Variable over panhandle area, with heaviest populations apparently in Carson County near town of Panhandle; ranged 500-1,500 per foot; controls being applied in some fields. Fairly heavy around Quanah, Hardeman County. (Daniels). Infestations severe enough in Wichita and Clay Counties to cause considerable browning in spots. (Collier). OKLAHOMA - Heavy populations (up to 500-600 per linear foot) noted killing plants in fields of small grain in Grandfield-Temple area, with heaviest counts most commonly noted near Grandfield, Tillman County. Some chemical controls have been applied in the area. Populations elsewhere in State continued to increase, but have not reached damaging proportions to date. Averaged 150-200 per linear foot in one field checked in Perkins area, Payne County, but no "greenbug spots" have been noted. "Greenbug spots" are appearing in a limited number of fields of small grain in Hennessey area of Kingfisher County. Some chemical controls have been applied in few fields; counts up to 125 per linear foot noted in area. (Okla. Coop. Sur.). ARKANSAS - None found in southwest, central and northwest areas. (Ark. Ins. Sur.).

ENGLISH GRAIN APHID (Macrosiphum granarium) - TEXAS - Most commonly found small grain insect in 25 north central, central and southern counties. Found generally in lush growths, especially in volunteer grains. If infestations continue to build up, wheat growers may become concerned with head infestations. (Chada). OKLAHOMA - Continued common in fields throughout grain-producing areas of State; counts varied widely from field to field in areas surveyed; ranged 10-75 per linear foot. (Okla. Coop. Sur.). ARKANSAS - Averaged less than one per linear foot in small grain in southwest, central and northwest areas. (Ark. Ins. Sur.).

APPLE GRAIN APHID (Rhopalosiphum fitchii) - OKLAHOMA - Heavy (averaged 2,000 plus per linear foot) in 210-acre field of wheat near Temple, Cotton County; controls applied. Counts elsewhere in State continued low, although gradual increase was evident. (Okla. Coop. Sur.).

CORN LEAF APHID (Rhopalosiphum maidis) - ARIZONA - Infestations medium and increasing in barley statewide. (Ariz. Coop. Sur.). TEXAS - Small numbers found in all fields of barley examined in 25 north central, central and southern counties. (Chada).

SPOTTED ALFALFA APHID (Therioaphis maculata) - NEW MEXICO - Populations have decreased in most fields of alfalfa in southern counties. (N. M. Coop. Rpt.). OKLAHOMA - Light numbers (up to 5 per square foot) continued common in alfalfa surveyed in southern half of State. (Okla. Coop. Sur.). ARKANSAS - None found in southwest, central and northwest areas. (Ark. Ins. Sur.).

WINTER GRAIN MITE (Penthaleus major) - TEXAS - Infestations appear to be diminishing in areas where previous damage was reported; does not appear to offer any threat to small grain crops. (Chada, Newton).

BROWN WHEAT MITE (Petrobia latens) - KANSAS - Present in some fields of wheat in Finney County; populations range light to moderately heavy. Damage to wheat plants noticeable in some cases. (DePew).

ARMY CUTWORM (Chorizagrotis auxiliaris) - KANSAS - Damaging wheat and alfalfa in western half of State. At present, problem area appears to be largely west of highway 281. Controls have been, or will soon be, applied to a few fields of wheat and alfalfa. Cool temperatures and strong winds slowed control activity this week. Counts range from less than 1 to 12 larvae per square foot; larvae range fourth to seventh instars, with majority in fifth and sixth instars. Severe damage caused in a few fields by larvae moving in typical "army" manner. (DePew, Harvey, Jones, Somsen, Peters).

EUROPEAN CORN BORER (Pyrausta nubilalis) - DELAWARE - Spring survey indicates a 46-percent survival of overwintering borers for a State average of 121 borers per 100 stalks. The average numbers of live borers in the fall of 1960 and the spring of 1961, respectively, by county, were as follows: New Castle, 132 and 58; Kent - 239 and 174; Sussex - 415 and 131. State averages were 262 in the fall of 1960 and 121 in spring of 1961. A state average mortality, due to mechanical injury, disease and bird feeding, of 34 borers per 100 stalks was noted during the survey. No pupation had occurred in the State by March 7. (Burbutis, Mason).

ALFALFA WEEVIL (Hypera postica) - GEORGIA - Larvae averaged 1-2 per terminal on alfalfa in Oconee County, now 3 inches tall; all terminals infested (Johnson); infesting alfalfa in Jasper County (Yearwood); and heavy on alfalfa in Lincoln County (McGee). NORTH CAROLINA - Young larvae being found in some fields in Wake County. (Farrier). DELAWARE - Hatching of overwintering eggs has begun. First and second-instar larvae found in several fields over State. Few adults also noted. (Burbutis, Mason).

CLOVER LEAF WEEVIL (Hypera punctata) - DELAWARE - Mature larvae common in field of alfalfa in New Castle County; also present in alfalfa elsewhere. (Burbutis, Mason).

PEA APHID (Macrosiphum pisi) - ARIZONA - Infestations continuing to increase in alfalfa statewide and are heavy in some areas. (Ariz. Coop. Sur.). ARKANSAS - Counts remain low in vetch and alfalfa in southwest, central and northwest areas; 2-4 per square foot. (Ark. Ins. Sur.). OKLAHOMA - Heavy populations noted on alfalfa with 4-6 inches of new foliage in river bottom areas of Bryan County. Light to medium (0.5-12 per square foot) in Choctaw County, with some gradual increase noted during past few weeks. (Okla. Coop. Sur.). NEW MEXICO - Moderate to heavy infestations continue damaging to alfalfa in southern counties. Majority of fields infested in Eddy County were plantings of Lahontan variety of alfalfa. (N. M. Coop. Rpt.).

LYGUS BUGS (Lygus spp.) - ARIZONA - Populations light in alfalfa; nymphs being collected, indicating reproduction has begun in this crop. (Ariz. Coop. Sur.).

CUTWORMS - NEVADA - Undetermined species moderate to heavy in alfalfa in Douglas County; migrations occurring on roads. (Weaver).

VEGETABLE WEEVIL (Listroderes costirostris obliquus) - CALIFORNIA - Medium population in a lawn in Corning, Tehama County. (Cal. Coop. Rpt.).

A GALL MIDGE (probably Rhopalomyia salviae) - CALIFORNIA - Heavy populations of all stages on sage in Paicines, San Benito County. (Cal. Coop. Rpt.).

FRUIT INSECTS

EASTERN TENT CATERPILLAR (Malacosoma americanum) - TEXAS - Newly hatched larvae very numerous in plums, peaches and Japonicas in Freestone County (Wells); locally heavy on peach trees in Blanco County (Garner).

FALL WEBWORM (Hyphantria cunea) - OREGON - Adults collected at a blacklight trap in Salem, week of March 5. (Capizzi).

A NOCTUID (Psychomorpha epimenis) - TEXAS - Adult female taken in light trap at College Station. (Wellso).

GREEN PEACH APHID (Myzus persicae) - COLORADO - Eggs very abundant on peach trees in Mesa County. High populations can be expected if eggs develop. (Colo. Ins. Sur., Mar. 3). NEW MEXICO - Eggs have been hatching on fruit trees during past 2 weeks. Mortality of young aphids appears to be very high. (N. M. Coop. Rpt.).

PEAR PSYLLA (Psylla pyricola) - OREGON - Eggs found in pear orchards in Roseburg area, Douglas County, during week of March 5. (Every).

COCCIDS - OREGON - Lecanium sp. appears more abundant than usual in prune orchards examined in Douglas and Marion Counties. (Every, Stephenson). TEXAS - Chrysomphalus obscurus moderate on pecans in College Station area. (Randolph). CALIFORNIA - Neopinnaspis harperi and Aspidiotus lataniae medium on pear in Montecito, Santa Barbara County. Epidiaspis piricola heavy on English walnut and Lepidosaphes ulmi medium on olive in Santa Rosa, Sonoma County. Latter species occurring on upper surfaces of limbs. (Cal. Coop. Rpt.).

EUROPEAN RED MITE (Panonychus ulmi) - OREGON - Eggs, probably of this species, abundant in fruit orchards in Roseburg area of Douglas County week of March 5. (Every).

CASEBEARERS (Acrobasis spp.) - GEORGIA - Acrobasis sp. infested 20 percent of pecan buds examined in Emanuel County. (Johnson, March 3). TEXAS - Hiberniculae of A. caryae found on many buds of one-year previous growth pecans in College Station area. (Randolph).

CITRUS WHITEFLY (Dialeurodes citri) - CALIFORNIA - Final treatment of 22 blocks in Sacramento, Sacramento County, was completed March 2. Two blocks will receive final treatment during 1962. No live whiteflies have been found in the 22-block eradication area for a period of 3 years, and is now considered eradicated. (Cal. Coop. Rpt.).

TRUCK CROP INSECTS

Potato Psyllid Survey in the Spring Breeding Areas of Arizona and California - 1961

A potato psyllid (Paratrioza cockerelli) survey was conducted March 2 and 3 in the overwintering areas of Arizona and California. Drought conditions prevailed over the survey area and wild Lycium, the preferred overwintering host, was dormant on approximately one-third to one-half of the area due to lack of moisture. Growing Lycium was generally in poor condition with leaves turning yellow and dropping. The weather throughout the entire survey was warm and clear with some heavy, intermittent winds in the Blythe-Barstow area of California.

Potato psyllid counts at most all stops were low to moderate as compared with 1959 and 1960 seasons. No eggs were observed. Nymphs were present at about one-third of the stops and were not as numerous as in the previous 2 years. The survey indicates a population much lower than 1959 and 1960, and a potential light movement of potato psyllid from the overwintering areas to the north.

Potato Psyllid Survey on Overwintering Hosts

		Average Number Per 100 Sweeps				
State	District	1961	1960	1959	1958	1957
Arizona	Phoenix-Tucson	149	665	992	93	95
California	Blythe-Barstow	41	282	237	96	143

CABBAGE LOOPER (Trichoplusia ni) - FLORIDA - Light to moderate on tomatoes in Ft. Pierce area (Hayslip) and appears to be increasing on cabbage at Sanford (Wilson). Moderate on cabbage, collards and cauliflower at Bradenton where questionable control methods were used. (Kelsheimer). Averaged one per head on 25 samples of untreated cabbage at Belle Glade. (Genung).

IMPORTED CABBAGEWORM (Pieris rapae) - NORTH CAROLINA - Adults seen for first time this year in Cumberland County. (Monroe, Farrier).

DIAMONDBACK MOTH (Plutella maculipennis) - FLORIDA - Larvae reported moderate on turnips at Ft. Pierce. (Hayslip).

CABBAGE APHID (Brevicoryne brassicae) - ARIZONA - Very heavy on older cole crops in central area. (Ariz. Coop. Sur.).

HARLEQUIN BUG (Murgantia histrionica) - NORTH CAROLINA - Averaged 12-15 per collard plant locally in Columbus County. (Read).

A SERPENTINE LEAF MINER (Liriomyza sp.) - FLORIDA - Continues number one pest of truck crops, although populations appear to be generally decreasing over most of State. Averaged one living larva per leaflet on celery at Belle Glade, with about 50 percent parasitism. (Harris). Also light to moderate on a 120-acre planting of pole beans. (Genung). Better controls noted in Ft. Pierce area. (Hayslip).

A THRIPS - ARIZONA - Heavy infestations of unidentified species reported damaging garden peas in Maricopa County. (Ariz. Coop. Sur.).

TWO-SPOTTED SPIDER MITE (Tetranychus telarius) - CALIFORNIA - Heavy on garden peas in Madera, Madera County, and heavy on Geum in San Diego, San Diego County. (Cal. Coop. Rpt.).

GREEN PEACH APHID (Myzus persicae) - ARIZONA - Continues very heavy on sugar beets in central area. Averaged 2-5 per leaf on small potatoes in same area. (Ariz. Coop. Sur.). FLORIDA - Reported at low level on potatoes being harvested at Homestead (Wolfenbarger) and also low on cabbage in Sanford area (Wilson). Reported increasing on bell peppers in Martin County (Hayslip); average 25-30 per leaflet on bell peppers and 40 per 100 leaflets on celery at Belle Glade (Harris). DELAWARE - Averaged 1 per 2 plants in large field of spinach in Sussex County. (Burbutis, Mason).

APHIDS - TEXAS - Light, local infestations of undetermined species attacking okra in 2-leaf stage in Cameron County; average 4 per leaf on half of plants. (Texas Coop. Rpt., Stephens). Heavy, local infestations attacking turnips; causing considerable curling and withering. (Texas Coop. Rpt., Day).

AN ACARID MITE (Tyrophagus sp.) - CALIFORNIA - Heavy on spinach in Rancho Santa Fe, San Diego County, during early February. (Cal. Coop. Rpt.).

TOBACCO INSECTS

VEGETABLE WEEVIL (Listroderes costirostris obliquus) - GEORGIA - Moderate on tobacco in the plant bed in Tift, Atkinson, Ware and Appling Counties; heavy in Berrien County. (Johnson).

TOBACCO FLEA BEETLE (Epitrix hirtipennis) - GEORGIA - Light to moderate on tobacco in the plant bed in Tift, Berrien, Atkinson, Ware and Appling Counties. (Johnson).

FOREST, ORNAMENTAL AND SHADE TREE INSECTS

PINE TUBE MOTH (Argyrotaenia pinatubana) - DELAWARE - Light infestation (pupae only) in white pine in New Castle County; no adult emergence noted. (Burbutis, Mason).

PROMETHEA MOTH (Callosamia promethea) - WISCONSIN - Of the 1,693 cocoons collected during the last 2 weeks of February in Dane County, 13.3 percent were attributed to have been fed on by birds, 1.12 percent partially crushed (cause unknown) and 0.83 percent possibly fed on by rodents. However, 65.7 percent are assumed to be viable and will be used in a combined phenological and biological study to be conducted during the 1961 season. In approximately 90 percent or more instances, cocoons were found on Prunus spp., generally 10 years of age or younger. (Wis. Coop. Sur.).

BAGWORM (Thyridopteryx ephemeraeformis) - NORTH CAROLINA - Bags present on Japanese maple in Craven County. (Jones).

A COSMOPTERYGID (Periploca n. sp.) - CALIFORNIA - This previously undescribed species has now been determined by R. W. Hodges, Cornell University, as a new species. Damage by this pest continues to be severe on ornamental junipers. (Cal. Coop. Rpt.). Previously reported in CEIR 11(8):77.

ELM LEAF BEETLE (Galerucella xanthomelaena) - OKLAHOMA - Adults becoming more active in hibernation quarters in many areas of State during periods of warm spring weather. (Okla. Coop. Sur.).

APHIDS - ARIZONA - Heavy infestations of several species a problem on flowers and shrubs statewide. (Ariz. Coop. Sur.). NEW MEXICO - Populations of unspecified species building up considerably on pansies, roses and arborvitae in southern counties. (N. M. Coop. Rpt.). OKLAHOMA - Several species becoming more common on a variety of shrubs in most areas. (Okla. Coop. Sur.). GEORGIA - An unidentified species moderate on rose in Lincoln County. (McGee).

COCCIDS - MARYLAND - Pseudococcus adonidum infesting lemon plant in home at Millersville, Anne Arundel County. (U. Md., Ent. Dept.). NORTH CAROLINA - Lecanium sp. killing 2 ornamental trees in Cumberland County. (Monroe, Farrier). Unaspis euonymi infesting 50 shrubs around a house; this infestation killed 6 plants during 1960. (Jones, Farrier). OKLAHOMA - Moderate to heavy infestations of several species common on variety of trees and shrubs checked in Tulsa County. (Okla. Coop. Sur.). CALIFORNIA - Adults of Diaspis boisduvalii heavy on palm in Santa Barbara, Santa Barbara County, and on fern in San Diego, San Diego County. Spilococcus implicatus light on Cupressus sp. and stock (Mathiola sp.) in Camarillo, Ventura County. Rhizoecus falcifer heavy in the ground on a property in San Diego County. (Cal. Coop. Rpt.).

ERIOPHYID MITES (Aceria spp.) - CALIFORNIA - Medium populations of A. baccharices in association with Macrosiphum sp. present on Baccharis sp. in Disneyland, Anaheim, Orange County. Light infestations of Aculus n. sp. occurring on Fraxinus sp. in a nursery in San Gabriel, Los Angeles County. (Cal. Coop. Rpt.).

SPIDER MITES - ARIZONA - Infestations increasing on evergreens and other ornamental plantings statewide. (Ariz. Coop. Sur.).

INSECTS AFFECTING MAN AND ANIMALS

CATTLE GRUBS (Hypoderma spp.) - MARYLAND - H. lineatum moderate to heavy on untreated cattle at Flintstone, Allegany County; ranging up to 12 per animal. (U. Md., Ent. Dept.). OKLAHOMA - H. lineatum infestations continue to decrease in cattle checked in most areas. (Okla. Coop. Sur.). NORTH DAKOTA - Examination of 259 head of cattle in western area sales yards revealed 25.5 percent of animals infested with Hypoderma sp. Of 92 infested animals, 42.4 percent had heavy, 14.1

percent had medium and 43.5 had light infestations. (N. D. Ins. Sur.). NEVADA - Larval specimens from Battle Mountain, Lander County, and from Gardnerville, Douglas County, determined as H. lineatum. (Arnett).

MOSQUITOES - DELAWARE - Third- and fourth-instar larvae of Culiseta melanura fairly numerous in one area of Milford, Sussex County. Second-instar larvae of Aedes stimulans present in woodland pool at Bombay Hook, Kent County, on March 6. (Lake). OKLAHOMA - Small numbers of Culiseta inornata feeding in sheltered wooded areas in vicinity of Stillwater, Payne County. (Okla. Coop. Sur.).

CATTLE LICE - NORTH DAKOTA - Inspection of 238 head of cattle showed 11.3 percent of animals infested with Bovicola bovis. Of 27 head carrying louse populations, 37 percent had heavy, 11.1 percent had medium and 51.9 percent had light populations. No sucking lice were observed. (N. D. Ins. Sur.). OKLAHOMA - Moderate to severe infestations of several species continued common on untreated cattle in most areas. (Okla. Coop. Sur.).

HOG LOUSE (Haematopinus suis) - OKLAHOMA - Moderate to severe infestations continued common on untreated hogs in many areas. (Okla. Coop. Sur.).

CHICKEN BODY LOUSE (Menacanthus stramineus) - KANSAS - Numerous on poultry flock in Riley County. (Knapp).

BED BUG (Cimex lectularius) - MARYLAND - Infesting a home at Baltimore. (U. Md., Ent. Dept.).

TROPICAL RAT MITE (Ornithonyssus bacoti) - CALIFORNIA - Light infestation found on child in Lincoln, Placer County. (Cal. Coop. Rpt.).

NORTHERN FOWL MITE (Ornithonyssus sylviarum)- NORTH CAROLINA - Numerous on a flock of Rhode Island Red chickens in Wake County. (Gast, Farrier).

BENEFICIAL INSECTS

LADY BEETLES - ARKANSAS - Becoming active in small grain and legume crops in southwest, central and northwest areas on warm days; principal species is Coleomegilla maculata. (Ark. Ins. Sur.).

LACEWINGS (Chrysopa spp.) - OKLAHOMA - Adults becoming common (0.1-1.0 per linear foot) in fields of small grain checked in west central area. (Okla. Coop. Sur.).

HYMENOPTEROUS PARASITES - ARKANSAS - Becoming more active in southwest, central and northwest areas on small grain and legume crops and readily observed on warm days. (Ark. Ins. Sur.). OKLAHOMA - Approximately 2 percent of aphid population found parasitized by Aphidius testaceipes in field of small grain in Perkins area, Payne County. (Okla. Coop. Sur.).

MISCELLANEOUS INSECTS

DERMESTIDS - MARYLAND - Larvae of Anthrenus flavipes and Attagenus piceus have injured woolens at localities in Baltimore. (U. Md., Ent. Dept.).

A SPIDER BEETLE (Ptinus sp.) - OKLAHOMA - Annoying numbers entering 2 homes in Stillwater area. (Okla. Coop. Sur.).

BOXELDER BUG (Leptocoris trivittatus) - NORTH CAROLINA - Numerous around buildings and houses in Ramseur, Randolph County; numbers have been increasing during past 4 years. (Mulder). COLORADO - Entering homes on warm days. (Colo. Ins. Sur., Mar. 3).

A PENTATOMID (Edessa florida) - MARYLAND - Adults, apparently seeking shelter, abundant in a home at East New Market, Dorchester County, on February 20. Nymphs and adults of this species were previously collected by T. L. Bissell on September 4, 1960, at Lexington Park, St. Marys County, on Convolvulus sepium v. repens. (U. Md., Ent. Dept.).

EARWIGS - SOUTH CAROLINA - Increasing around homes in Charleston and other coastal areas. (Adkins, Mar. 3).

EASTERN SUBTERRANEAN TERMITE (Reticulitermes flavipes) - MARYLAND - Winged forms appearing in homes in Charles and St. Marys Counties. (U. Md., Ent. Dept.).

IMPORTED FIRE ANT (Solenopsis saevissima richteri) - NORTH CAROLINA - By far, the majority of new mounds have been found on untreated areas. (Branon).

ANTS - DELAWARE - Tetramorium caespitum fairly abundant in home in New Castle County. (Burbutis, Mason). MARYLAND - Winged forms of Monomorium minimum noted in home at Silver Spring, March 6. (U. Md., Ent. Dept.).

A BEE MITE (Acarapis dorsalis) - WYOMING - Adults and eggs found in dorsal scutellar groove on thorax of honey bee (Apis mellifera) adult workers in apiaries of U. S. Bee Culture Research Laboratory at Laramie. About 3 percent of bees examined found infested in late February. A. externus, a similar species, known to breed on the ventral side of the neck of honey bees, was not found. This is believed to be the first record of A. dorsalis in the State. A. dorsalis is, however, not known to be of economic importance. (J. D. Hitchcock).

CLOVER MITE (Bryobia praetiosa) - ARIZONA - Large numbers moving from lawns to homes are a problem in some areas of Maricopa County. (Ariz. Coop. Sur.). COLORADO - Entering homes on warm days. (Colo. Ins. Sur., Mar. 3). KANSAS - Causing a nuisance to householders in Riley, Barton and Seward Counties. (Peters).

CORRECTIONS

CEIR 11(3):31 - Delete Australia from distribution of Hyperodes bonariensis.

CEIR 11(6):59 - CLOVER MITE (Bryobia praetiosa) - CALIFORNIA - Should read "Heavy adult populations invading a house in Santa Maria, Santa Barbara County."

CEIR 11(8):79 - RED SCALE (Ceroplastes rubens) - FLORIDA - Should read "Collected on tropical breadfruit at Miami, Dade County, on February 9. (J. R. McFarlin)."

CEIR 11(8):79 - LADY BEETLES - NEW MEXICO - Should read "Becoming prevalent in alfalfa and small grain fields in southern counties."

CEIR 11(8):98 - A BILLBUG (Sphenophorus callosus) - Should read "was exceedingly abundant on muck soil in Montgomery County, INDIANA, planted to corn."

LIGHT TRAP COLLECTIONS

	Pseud. unip.	Agrot. ips.	Feltia subterr.	Perid. saucia	Prod. ornith.	Trich. ni
ARIZONA						
Mesa 2/26-3/5				3		1
FLORIDA						
Monticello 3/7			13			
Quincy 3/7	1	2	7			
SOUTH CAROLINA						
Clemson 3/4-10	1	1			18	
TENNESSEE (Counties)						
Madison 2/28-3/6	1					
Greene 2/28-3/6	7			1		
Blount 2/28-3/6	1	3			3	
Johnson 2/28-3/6					1	

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Summary of Insect Conditions - 1960 1/

(continued from page 138)

TRUCK CROP INSECTS

General Truck Crop Insects: CABBAGE LOOPER (Trichoplusia ni) was a major pest of various truck crops in several states during the 1960 season. The most serious infestations appeared to have occurred in CALIFORNIA, ARIZONA, TEXAS, INDIANA and VIRGINIA.

Cabbage looper was a serious pest of lettuce, tomatoes, potatoes, celery, melons and peppers in addition to cabbage and cole crops, statewide, in CALIFORNIA during 1960. Counts of 2-4 larvae per plant on cole crops were common in central and southwestern ARIZONA during October and November. In UTAH, injury by cabbage looper was nearly average for 1960 and it caused the most loss of the insects infesting cabbage in COLORADO during the year. Cabbage looper caused economic damage to vegetables in southern vegetable areas of TEXAS, as well as on the high plains of that State during 1960. The pest was present in economic numbers on "greens" in east central OKLAHOMA during July, and was important on many crops in ARKANSAS. In LOUISIANA, cabbage looper was light on sweetpotatoes in St.Landry Parish and unusually low in the early spring on cole crops; but, as usual, untreated winter cabbage was 100 percent infested. Infestations of cabbage looper were light to moderate on cabbage and collards in GEORGIA during the season.

Cabbage looper was first noted on cabbages in the Racine-Kenosha area of WISCONSIN during mid-July, but failed to increase to any degree during the remainder of the season. In INDIANA, it was destructively abundant on cabbage and related crops during July and August and damage was especially severe in spite of the braconid parasite (Apanteles glomeratus) which was abundant in many areas.

Cabbage looper was abundant on the Eastern Shore of VIRGINIA, infesting cucumbers, tomatoes, broccoli and other truck crops. Control was rather difficult as insecticides commonly used proved ineffective, but a polyhedrosis virus appeared to be helpful in decreasing the severity of damage. The pest was again troublesome during the season on cole crops in MARYLAND, and was present on carrots, peppers, tomatoes, squash and lima beans in DELAWARE from late June to late October, statewide. Larvae were abundant on tomatoes in New Castle County during mid-August. Cabbage looper was one of the major pests of crucifers in CONNECTICUT, particularly late in the season. The species was somewhat less numerous in NEW HAMPSHIRE than during 1959 and light infestations caused light injury to rutabagas in Cumberland County, MAINE, during 1960.

TOMATO FRUITWORM (Heliothis zea) caused some damage to various crops, but infestations were lighter in some states during 1960 than occurred during 1959. Tomato fruitworm was not as serious to vegetable and truck crops in DELAWARE as in 1959, but caused some injury to lima bean pods in Kent County, particularly in late August; to tomatoes in Kent County in late June to early July; and to pumpkin squash, carrots and peppers during late September. Injury by tomato fruitworm to pods of snap and lima beans during late season in MARYLAND was the lowest in that State in 3 years. The pest attacked beans and broccoli on the Eastern Shore of VIRGINIA during September, but damage was light, although several lots of beans were refused by buyers because of excessive fruitworm damage.

Tomato fruitworm ranged light to heavy on tomatoes in GEORGIA during 1960 and was heavy in one field of strawberries in East Baton Rouge Parish, LOUISIANA, during May when infested fruits averaged 5 per pint. It was heavy in ARKANSAS, but lighter than during 1959, and numbers were about the same on snap beans in that State as last year. Tomato fruitworm caused moderate pod damage to commercial fields of snap beans and cowpeas in east central OKLAHOMA during late summer and early fall, and economic damage to various vegetable crops throughout TEXAS during 1960. Infestations were relatively unimportant in INDIANA during 1960 and caused

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1/ See addendum on page 187

only light loss to tomatoes in eastern COLORADO. In CALIFORNIA, this pest was present early in the year, but did not develop into a serious problem until midsummer and fall, when practically all truck crops over the State were infested. Tomato fruitworm was probably the number one pest, dollar-wise, in California during 1960.

Larvae of YELLOW-STRIPED ARMYWORM (Prodenia ornithogalli) caused light feeding injury during July, August and September in DELAWARE to carrots in New Castle County; lima beans, cantaloups and sweetpotatoes in Kent County; and to peppers and lima beans in Sussex County. Light infestations of this noctuid were present on sweetpotatoes in St. Landry Parish, LOUISIANA. WESTERN YELLOW-STRIPED ARMYWORM (P. praefica) caused only local damage to tomatoes, beets and home gardens in UTAH; light, spotted damage to potatoes in Washoe County, NEVADA; but was more prevalent and widespread in CALIFORNIA during 1960 than in past years, requiring a great deal of treating in order to control infestations.

ARMYWORM (Pseudaletia unipuncta) was considered a statewide problem in CALIFORNIA during 1960, with heavier and more general populations present this year than during 1959. BEET ARMYWORM (Spodoptera exigua) was another pest that was a considerable problem on truck crops in California, with most damage being reported from the southern portion of the State.

STALK BORER (Papaipema nebris) caused heavy to extensive damage to a variety of vegetables in home gardens in north central, central and east central areas of OKLAHOMA during late June, July and early August. It bored into pepper stalks at several localities in Worcester County, MARYLAND, during June, but total injury was light. The pest was present in light numbers in Kennebec County, MAINE, where it caused light damage to green peppers.

Egg masses and first-instar larvae of EUROPEAN CORN BORER (Pyrausta nubilalis) were present on potatovines in Kent and New Castle Counties, DELAWARE, during late May to early June. Larval numbers increased on potatovines until early July, at which time damage became quite apparent. Larvae of the pest were quite damaging to asparagus ferns in Kent County during early July, and mature second-generation larvae were common in peppers in Sussex County early in August. Several new egg masses of European corn borer were found on pepper during late August. Generally, however, the pest was not as serious in Delaware during the 1960 season as during 1959. Damage by European corn borer to peppers in MARYLAND occurred in isolated plantings but was not general, and the pest damaged peppers, potatoes and tomatoes in some areas of VIRGINIA during the 1960 season. In MICHIGAN, gross returns were down $120 per acre on 600 acres of peppers, or $72,000, as a result of European corn borer. GARDEN WEBWORM (Loxostege similalis) was important on various truck crops in ARKANSAS during 1960 and was present on sugar beets almost everywhere in COLORADO.

Several species of CUTWORMS were common in INDIANA during the spring months of 1960 and caused significant losses to home gardens. BLACK CUTWORM (Agrotis ipsilon) and GRANULATE CUTWORM (Feltia subterranea) caused considerable damage to tomatoes and peppers in St. Tammany Parish, LOUISIANA, during April and May. Cutworms were a problem throughout the year in ARIZONA on seedling plants of most vegetable crops, while in COLORADO, black cutworm contributed to losses on potatoes, with controls keeping losses at a low level. Cutworm damage in UTAH was generally moderate in the spring and various species were present in moderate numbers in Lyon and Washoe Counties, NEVADA, damaging onions and potatoes. Cutworms were active and damaged many truck crops in CALIFORNIA during 1960. Generally, infestations were spotty and of local occurrence. Medium populations of a CUTWORM (Proxenus mindara) developed on strawberries in the Salinas area of Monterey County and in Santa Clara County, and on melons in Merced and Stanislaus Counties. RED-BACKED CUTWORM (Euxoa ochrogaster) was destructive in ALASKA only to vegetable crops at McGrath during the 1960 season.

SALT-MARSH CATERPILLAR (Estigmene acrea) infestations and damage to vegetables were moderate in southern Kennebec County, MAINE, during the year. During mid-August, salt-marsh caterpillar was common in one field of lima beans in Kent County, DELAWARE, causing considerable feeding injury; and the insect was also common on cantaloups in the same county during late August. During September in Evangeline Parish, LOUISIANA, larvae of this pest averaged 18 per 50 sweeps on sweetpotatoes. In CALIFORNIA, salt-marsh caterpillar was of general occurrence during 1960, but attacked truck crops in light populations locally.

Adults of POTATO LEAFHOPPER (Empoasca fabae) became common during the entire growing season in DELAWARE wherever snap beans, lima beans, potatoes, peppers, cucumbers, watermelon, carrots, squash and sweetpotatoes were grown; and it was troublesome in all sections of MARYLAND on beans and potatoes during July and August. Potato leafhopper increased to outbreak proportions on untreated, late potatoes in VIRGINIA during the season, with entire fields being killed outright. However, the infestation occurred late enough so that the yield was not affected appreciably. The pest was also quite numerous on snap and lima beans in some areas of Virginia during 1960.

Potato leafhopper was less numerous than usual on potatoes in INDIANA during the season; and the leafhopper was present on snap beans in Fond du Lac, Washara, Columbia, St. Croix, Trempealeau and Chippewa Counties, WISCONSIN, the first week of July, but attained populations of only one per 10 plants. The pest remained scarce on potatoes in southeastern Wisconsin counties, but built up slightly in the areas of Rice Lake (Barron County) and Spooner (Washburn County). Numbers increased to 3-4 per plant in some fields in the central area by mid-August, but overall populations were considerably lower in Wisconsin than during 1959. The first potato leafhopper specimens of the season in NORTH DAKOTA were collected at Oakes, Dickey County, June 7. Populations were low throughout June and July, but increasing numbers were noted early in August. By late August, populations reached economic levels and control was necessary. In SOUTH DAKOTA, first potato leafhoppers were reported on June 27. Populations were moderate late in the summer, but very little "hopperburn" damage appeared in fields of potatoes in South Dakota during 1960.

Migrants of SIX-SPOTTED LEAFHOPPER (Macrosteles fascifrons) were first observed in WISCONSIN about May 27 in fields of oats in Iowa and Lafayette Counties. Populations remained very low during 1960, the highest count being made in a field of oats in Taylor County on July 8, where six-spotted leafhopper averaged one per sweep. Incidence of aster yellows was very low in Wisconsin during the 1960 season. Populations of six-spotted leafhopper were generally low in NORTH DAKOTA during June and July, but increasingly heavy populations ranging 5-10 per sweep were noted in fields of potatoes during the first week of August. Late-season populations of this pest required controls. Six-spotted leafhopper contributed to losses on potatoes in COLORADO during 1960, but controls kept these losses at a low level. The pest was responsible for occasional damage to vegetable crops in local areas of UTAH during the year and unspecified species of LEAFHOPPERS became numerous on raspberries in some localities of the State during the fall. Another LEAFHOPPER (Empoasca filamenta) caused considerable damage to vegetable crops in local areas of Utah during the 1960 season and was numerous on potatoes in Kittitas County, WASHINGTON, during July, when it etiolated the lower foliage. In ALASKA, six-spotted leafhopper, the vector of aster yellows, was found in Kodiak. Populations of Empoasca sp. were heavy on cantaloups during the spring in ARIZONA, but populations of Empoasca sp. were below normal on sweetpotatoes in LOUISIANA during 1960.

Infestations of GREEN PEACH APHID (Myzus persicae) were serious on several truck crops during the 1960 season, with heavy numbers or losses being reported from RHODE ISLAND, DELAWARE, VIRGINIA, FLORIDA, TEXAS, ARIZONA, CALIFORNIA and NEVADA.

Green peach aphid was locally severe on potatoes in the southern portion of RHODE ISLAND early in August. Colonies of the aphid were common in DELAWARE on cabbage, horseradish, potatoes, tomatoes, cucumbers and peppers during most of the 1960 season, with a considerable buildup of numbers on potatoes, tomatoes and peppers during July and early August. During October, colonies of green peach aphid were present on cauliflower,spinach and kale in Kent and Sussex Counties and were numerous on turnips in New Castle County. As in 1959, this aphid was a serious pest of late potatoes in Kent County and peppers in Sussex County, Delaware. Green peach aphid was generally light on peppers on the Eastern Shore of MARYLAND, as compared with previous years, but caused considerable loss to spinach in VIRGINIA during the spring. Green peach aphid was abundant on potatoes in the southern Dade County area of FLORIDA this season, but less so than during 1959. The aphid was perhaps more abundant over a shorter period of time during 1959; however, numbers appear to be fewer during 1960 but lingered longer. Green peach aphid was light on collards in St. John the Baptist Parish, LOUISIANA, during the spring, but was troublesome on vegetable crops in ARKANSAS. Infestations of this pest were rather heavy on sweet peppers in the lower Rio Grande Valley of TEXAS and damaged one or more types of truck crops in OKLAHOMA to a limited extent during the 1960 season.

Green peach aphid contributed to losses on potatoes in COLORADO, but controls kept these losses at a low level. The aphid was heavy on sugar beets during early March in the central area of ARIZONA, where populations remained high and flights of winged forms were heavy the remainder of the month. Fall infestations on sugar beets in the State were very light. Green peach aphid was generally present over CALIFORNIA, with medium to heavy infestations on most truck crops in many areas. In many locations, populations persisted throughout the hot weather into the fall. Heavy populations of green peach aphid developed on sugar beets in Clark County, NEVADA, during March and April, but by May had been greatly reduced by predators. The aphid was common on potatoes in Flathead County, MONTANA, during 1960.

POTATO APHID (Macrosiphum euphorbiae) was light to moderate on potatoes in RHODE ISLAND during 1960, first appearing early in June. It was common statewide on potatoes, tomatoes and squash in DELAWARE, but never reached serious proportions during the year. Populations of potato aphid ranged light to moderate on potatoes and tomatoes in commercial areas of MARYLAND and the pest was unusually abundant in VIRGINIA during May. In COLORADO, controls kept losses to potatoes from this pest at a low level during the 1960 season.

Disease-carrying APHIDS caused losses of $200,000 to slicing cucumbers, $100,000 to late cantaloups and $150,000 to peppers in MICHIGAN during 1960. Aphids in general were prevalent in CALIFORNIA during the year and occurred over a longer period of time than usual. All truck crops were attacked in the State and considerable control was required. Infestations were general with local, heavy populations.

WHITEFLIES, in general, were present in CALIFORNIA during the year, attacking beans, strawberries and tomatoes, primarily in the San Joaquin Valley and southern portions of the State. Most damage to truck crops in California by LYGUS BUGS (Lygus spp.) was caused by migrating adults; bean crops were the most severely damaged, while strawberries had local infestations.

Adults of TARNISHED PLANT BUG (Lygus lineolaris) appeared in some fields of potatoes in MAINE early in July, but numbers were small and injury was light throughout the season. In DELAWARE, the bug infested snap beans, lima beans, potatoes, cucumbers, horseradish, carrots, asparagus ferns and turnips during 1960, but infestations were much lower this season than during 1959. Also in Delaware,adults of GARDEN FLEAHOPPER (Halticus bracteatus) were generally present on snap beans, potatoes, lima beans, cucumbers, carrots and pumpkin squash over the State. Adults became prevalent on cucumbers and common on lima beans in Kent County during late July, causing light feeding injury, and were also common on lima beans and pumpkin squash in New Castle County during September. Garden fleahopper attached beans and sweetpotatoes in Davidson County, NORTH CAROLINA, during 1960 for the first time in 7 years anywhere in the State. Populations of THREE-CORNERED ALFALFA HOPPER (*Spissistilus festinus*) were below normal on truck crops in LOUISIANA during the 1960 season.

Of the Coleoptera attacking various truck crops during the 1960 season, LEAF BEETLES were the most numerous with respect to the number of species involved.

Adults of SPOTTED CUCUMBER BEETLE (*Diabrotica undecimpunctata howardi*) were common throughout the growing season in DELAWARE on snap beans, cucurbits, tomatoes, watermelons, horseradish, lima beans, squash, cantaloups, carrots and spinach,but, as in previous years, the pest was not serious on any one crop. Spotted cucumber beetle was heavy on cantaloups and watermelons in GEORGIA; damaged untreated cucurbit seedlings in ARKANSAS; and caused extensive damage to home gardens in the eastern half of Bryan County, OKLAHOMA. Spotted cucumber beetle was abundant on many vegetable crops in INDIANA during August and September, but was not as abundant on cucumbers as during 1959 and caused little damage to cucurbits. Adults of this beetle were abundant on cucurbits in SOUTH DAKOTA during the midsummer season and caused moderate damage to susceptible crops in southern UTAH.

As usual, WESTERN SPOTTED CUCUMBER BEETLE (*Diabrotica undecimpunctata undecimpunctata*) damaged a number of commercial crops and home plantings in OREGON. Control was necessary on hops in Josephine County and on beans in the Willamette Valley early in June.

CUCUMBER BEETLES (*Diabrotica* spp.) were present in CALIFORNIA, with damage varying light to heavy from San Diego to San Mateo Counties. Melons, beans, spinach and squash were the most generally attacked crops.

BANDED CUCUMBER BEETLE (*Diabrotica balteata*) heavily damaged the sweetpotato crop in St. Landry and Acadia Parishes, LOUISIANA, during 1960. The usual soil treatments appeared to be ineffective and foliage treatments were thus made to control adults. Populations appeared heaviest in fields acjacent to corn and soybeans. In FLORIDA, banded cucumber beetle infested 1-2 percent of young seeded tomato plants in the Redland area of Dade County on October 17.

STRIPED CUCUMBER BEETLE (*Acalymma vittata*) was present in above-average numbers in southern MAINE during 1960. Damage was moderate to cucurbits in Androscoggin and Sagadahoc Counties, moderate to winter squash in Penobscot County and light to moderate on cucumbers and squash in Cumberland and Kennebec Counties. Large numbers of adults of striped cucumber beetle were collected in DELAWARE in a blacklight trap at Bridgeville, Sussex County, on May 23 and were found to be very common on small plantings of cucurbits shortly thereafter. Adults were abundant in one field of Zucchini squash during late May in Kent County and again on cantaloup in Sussex County during mid-June. During the remainder of the season adults were numerous over the State.

Striped cucumber beetle was less numerous on the Eastern Shore of VIRGINIA during 1960 than for some years, but it was heavy on cantaloups and watermelons in GEORGIA. Of the plants examined in one field of cucumbers in Tangipahoa Parish, LOUISIANA, first-generation adults of striped cucumber beetle averaged 6 per plant and about 50 percent of the plants showed symptoms of the bacterial wilt disease. In June, infestations of this beetle were general on cucumbers, squash and beans in Catahoula and West Carroll Parishes. Striped cucumber beetle damaged untreated cucurbit seedlings in ARKANSAS and caused more injury in INDIANA during 1960 than for the past several years. Populations of this beetle were heavy during late June and early July in ILLINOIS and controls were necessary to save cucurbits in many areas of the State. Striped cucumber beetle was also abundant on cucurbits in SOUTH DAKOTA during the midsummer season and caused moderate damage to susceptible crops in southern areas of UTAH.

FLEA BEETLES were abundant in some areas on various vegetable crops during the 1960 season. POTATO FLEA BEETLE (Epitrix cucumeris) was troublesome in most areas of MAINE, with damage ranging light to heavy. Beans were most heavily attacked in Androscoggin and Sagadahoc Counties, with tomatoes and potatoes suffering most injury in other areas of the State. Unspecified species of FLEA BEETLES were quite numerous on various vegetables in PENNSYLVANIA during the season; and adults of potato flea beetle were variable in separate fields over DELAWARE, but generally did not build up to economic proportions on potatoes until late June and remained abundant on this crop until late July. Injury in varying amounts occurred on tomato, beans, cucurbits, eggplant and watermelon during the growing season over the State, with the heaviest infestation occurring on eggplant in Kent County during mid-June. PALE-STRIPED FLEA BEETLE (Systena blanda) was fairly common on squash, potatoes and beans during June, July and early August over Delaware, but did not build up to serious proportions this year. In MARYLAND, potato flea beetle and TOBACCO FLEA BEETLE (E. hirtipennis) were abundant on potatoes and tomatoes and Phyllotreta spp. were very abundant on cole crops, all requiring controls in many instances. Infestations of potato flea beetle in VIRGINIA during 1960 were about the lightest on record for that State.

Pale-striped flea beetle was much more abundant than normal during June in INDIANA when cucumbers were seriously damaged. Various flea beetles were abundant on potatoes, tomatoes, horseradish, turnips and radishes in home gardens in eastern ILLINOIS, with several treatments necessary to keep populations low and prevent damage to plants. Potato flea beetle was heavy on tomato sets in Dane County, WISCONSIN, on May 15 and generally heavy on potatoes in most sections of the State. By midseason, populations had decreased considerably, but by the first week of September, second-generation potato flea beetle adults had increased noticeably.

Potato flea beetle was abundant on garden plots of potatoes in SOUTH DAKOTA during the season, but the amount of damage is unknown. WESTERN BLACK FLEA BEETLE (Phyllotreta pusilla), WESTERN POTATO FLEA BEETLE (Epitrix suncrinita) and other species injured potato tubers in most commercial areas of MONTANA during 1960 and sugar beets were attacked in Ravalli County. Larvae of STRIPED FLEA BEETLE (P. striolata) damaged roots of sugar beets in the Torrington area of WYOMING and adults damaged leaves of beet seedlings in Goshen, Park and Washakie Counties. Controls were applied in many areas, but application of insecticides was too late to be effective. TUBER FLEA BEETLE (E. tuberis), pale-striped flea beetle and another FLEA BEETLE (E. parvula) infested beans in COLORADO, but effective controls kept losses at a minimum. Tuber flea beetle also infested potatoes in the State, but losses were kept at a low level. Damage from stiped flea beetle and other flea beetles was moderate in vegetable gardens in UTAH during 1960, but some fields of potatoes were severely injured. Another FLEA BEETLE (Systena taeniata) became a problem on potato plantings in Santa Barbara County, CALIFORNIA, during the year.

BLISTER BEETLES were also of some importance on truck crops during 1960. An unidentified species of blister beetle caused moderate damage to beans and peas in some areas of Washington County, MAINE, and adults of MARGINED BLISTER BEETLE (Epicauta pestifera) heavily damaged beet foliage in Narragansett, RHODE ISLAND, during late July and early August. Margined blister beetle was very common during this same period in a few fields of tomatoes and snap beans in Sussex County, DELAWARE, and injury was heavy to these crops. Although generally not a serious pest to vegetable and truck crops in Delaware, adults of BLACK BLISTER BEETLE (E. pennsylvanica) caused light feeding injury to lima beans in New Castle County during late August and early September. Adults probably migrated from nearby forage crops where they were unusually common during the 1960 season. Adults of Epicauta sp. were fairly common on carrots and potatoes during late July and early August in New Castle County, Delaware.

Margined blister beetle injured some gardens in Dare County, NORTH CAROLINA, early in August and a STRIPED BLISTER BEETLE (*Epicauta* sp.) was the principal pest of tomatoes, being reported locally from the Coastal Plain and Piedmont areas, with up to 6 adults per plant in some instances. Infestations of a striped blister beetle were generally light on commercial tomatoes in southern GEORGIA during 1960; however, infestations on commercial tomatoes in the mountains were moderate to heavy. Extensive damage by unidentified blister beetles occurred in some home gardens in most sections of OKLAHOMA from mid-July through early October. These outbreaks were more common during 1960 than for the past 2 years in that State. In INDIANA, several species of blister beetles were common on many crops, with some reports of localized abundance on tomatoes being received.

A WIREWORM (*Ctenicera* sp.) riddled potatoes in the Haines area of southeastern ALASKA during the 1960 growing season and caused minor trouble elsewhere in that State. Unspecified species of WIREWORMS required preplant trap crops or treatment in the Santa Maria area of Santa Barbara County, CALIFORNIA, for potatoes and strawberries and developed heavy populations in strawberry plantings in Shasta County. These pests also damaged commercial plantings of potatoes and other vegetables in the western portion of MONTANA and a WIREWORM (*Hypolithus nocturnus*) severely attacked potatoes in several localities in NORTH DAKOTA during the year. In GEORGIA, heavy damage by an unspecified species of wireworm occurred to sweetpotatoes in the Leesburg area of Lee County.

SEED-CORN MAGGOT (*Hylemya cilicrura*) developed medium infestations in garbanzo beans in Butte County, CALIFORNIA, during March and the pest caused losses to onion in COLORADO during the season. Seed-corn maggot was present in economic numbers in OREGON, damaging beans in the Willamette Valley by late spring. Prolonged cool, damp weather favored maggot development in the State. Seed-corn maggot was found in already infested turnips in the Matanuska Valley of ALASKA.

SERPENTINE LEAF MINERS damaged some fields of tomatoes in VIRGINIA and caused some damage to tomatoes during November in East Baton Rouge Parish, LOUISIANA. In FLORIDA, serpentine leaf miners infested potatoes, tomatoes and other plants at Homestead, Dade County. These pests were abundant as usual, but began to disappear during March, perhaps due to enemies. A LEAF MINER (*Pegomya* sp.) was common on vegetables in the Matanuska and Tanana Valleys of ALASKA during the 1960 season.

LEAF MINERS were of some concern in CALIFORNIA during the 1960 season. Light to medium infestations developed on artichokes in Santa Clara County; melons in Fresno County; celery in Santa Barbara County; tomatoes in Sacramento, San Joaquin and San Diego Counties; and strawberries and asparagus in Santa Cruz County. Infestations were also high on asparagus in Borrego, San Diego County, and on lima beans in Orange County.

Several species of VINEGAR FLIES (*Drosophila* spp.) were found infesting fruits, melons and tomatoes, in CALIFORNIA. In the San Joaquin and Sacramento Valleys and in northern coastal areas of the State, a special survey was made during 1960 to determine the extent of this problem. Heavy populations were found and investigations by industry agriculture are continuing in order to provide relief for this problem in California.

Populations of GARDEN SPRINGTAIL (*Bourletiella hortensis*) were high on young beans, potatoes and tomatoes in MARYLAND early in the season; however, injury to these crops was generally light. Two other SPRINGTAILS (*Folsomia fimetaria* and *Pseudosinella violenta*) were common in soil of fields of carrots and on carrots in UTAH at Lewiston and Benson in Cache County during July. Unspecified SPRINGTAILS have been the cause of condemning celery for several years in succession near Palmer, ALASKA, because of the presence of large numbers in stalks; however, no apparent damage occurs. Springtails caused minor damage to cabbage seedlings in the Tanana Valley of Alaska during 1960.

GARDEN SYMPHYLAN (Scutigerella immaculata) occurred on sugar beets in Weld County, COLORADO, during 1960, reducing the stand in some fields and occasionally attacking commercial crops in scattered localities of UTAH. Garden symphylan continues to be one of the most serious pests of vegetables in OREGON, especially on irrigated soils. The annual estimated loss due to symphylan damage is set at $1,500,000 in Oregon. Garden symphylan was very serious in WASHINGTON because of the cool, wet spring. The pest was particularly damaging to pole beans, cucurbits, mint, rhubarb and strawberries in western sections of the State, and asparagus in the eastern area.

Unspecified species of THRIPS were very abundant on very young, direct-seeded pepper plants in Sussex County, DELAWARE, late in June and caused rather heavy feeding injury; and were again abundant on beans, cucumbers, onions and peppers in MARYLAND during the summer. Thrips in general damaged beans, cabbage, onions, garlic, lettuce, peppers, peas and cucumbers over CALIFORNIA during the season.

Unspecified species of GRASSHOPPERS damaged one or more types of truck crops in OKLAHOMA to a limited extent during 1960. During July and August, RED-LEGGED GRASSHOPPER (Melanoplus femurrubrum), DIFFERENTIAL GRASSHOPPER (M. differentialis) and TWO-STRIPED GRASSHOPPER (M. bivittatus) caused considerable localized damage to tomatoes in INDIANA. A FIELD CRICKET (Acheta sp.) caused considerable damage to truck crops in Imperial County, CALIFORNIA.

Various SPIDER MITES were present throughout the truck crop growing area of VIRGINIA during 1960 and caused extensive damage to snap beans and tomatoes in the Exmore area of Northampton County and spider mites caused limited damage to one or more types of truck crops in OKLAHOMA during 1960. Undetermined species of spider mites infested sugar beets in Carbon County, MONTANA. Medium to heavy infestations of these pests were a problem on some sugar beets in central ARIZONA, and were heavy on watermelons in Yuma County during May. MITES in general appeared early in CALIFORNIA, but were not severe. Strawberries, celery, beans and watermelons were attacked in varying degrees, becoming severe during midsummer.

TWO-SPOTTED SPIDER MITE (Tetranychus telarius) infested beans in COLORADO during 1960, but controls were effective and losses were at a minimum. In CALIFORNIA, this mite was one of the most damaging pests of truck crops beginning in May and continuing through October, attacking strawberries, raspberries, beans and corn. Two-spotted spider mite was a pest of beans in the Willamette Valley of OREGON beginning in July, and became economic by mid-August. The mite is becoming more widespread as a pest in WASHINGTON every year. During 1960, it damaged sugar beets, potatoes, corn, alfalfa and mint from mid-July through August and damaged sugar beets as late as October.

EUROPEAN EARWIG (Forficula auricularia) was particularly troublesome during May in home vegetable gardens in the Westerly area of RHODE ISLAND.

Unusually high populations of 2 species of SLUGS (Agriolimax agrestis and Arion ater) were damaging to vegetable crops in the Puyallup Valley of WASHINGTON during the spring. Development of GRAY GARDEN SLUG (Deroceras reticulatum) was favored by cool, wet, spring weather in OREGON and considerable damage occurred in the Willamette Valley to various crops including strawberries, beets and cauliflower. Undetermined species of SLUGS injured gardens in Forsyth County, NORTH CAROLINA, in mid-July.

Insects Attacking Solanaceous Crops: Infestations of POTATO PSYLLID (Paratrioza cockerelli) were light to moderate on potatoes in Kern County, CALIFORNIA, and medium on some potatoes in central ARIZONA during the spring of 1960. The pest caused light losses to tomatoes in eastern COLORADO. Potato psyllid occurred in WYOMING later in 1960 than during 1959. First potato psyllids were reported in

Goshen and Laramie Counties on July 22 and in Park County one week later. Counts averaged 2-3 per 100 sweeps in each field, with an occasional egg or nymph being found. Numbers increased until August 10, when counts reached 5 per 100 sweeps, but populations dropped very rapidly afterward. Some damage was reported in Park and Goshen Counties, but treatments throughout Wyoming effectively controlled any serious outbreak. For information on the survey in the spring breeding areas of Arizona, California, New Mexico and Texas for 1960, see CEIR 10(16):294.

The potato APHIDS in MAINE were summarized as follows: Early conditions favored development on, and migration from, primary hosts. Migrations of stem mothers of POTATO APHID (Macrosiphum euphorbiae) and FOXGLOVE APHID (Myzus solani) began on swamp rose and hawkweed, respectively, on May 18; BUCKTHORN APHID (Aphis nasturtii) and GREEN PEACH APHID (Myzus persicae) on alder-leafed buckthorn and Canada plum, respectively, on May 19; these were about average dates. The appearance of spring migrants of potato aphid and green peach aphid began about June 2, buckthorn aphid and foxglove aphid soon after, a little ahead of average. About 6 percent of the potato plants at Aroostook Farm were infested June 14-17; this level was slightly above normal for this date. Aphid populations were still small in early July but increased rapidly on untreated plantings. Potato aphid predominated, followed by buckthorn aphid, foxglove aphid and green peach aphid. Aphid numbers reached substantial levels by mid-July, with green peach aphid and foxglove aphid numbers still low. Populations began a rapid increase during late July, a near-normal date. Potato aphid still predominated, but green peach aphid increased sharply during this period. Populations continued to rise until about the second week of August, and potato aphid and buckthorn aphid were about equal in population levels. Buckthorn aphid fall migration began about August 11-12, a bit ahead of the usual date, and parasitized and dead diseased potato aphids became more abundant about this time. All species showed a sharp decline during late August to early September. Fall migration of potato aphid began about August 21, which is the usual time.

Foxglove aphid overwintered on strawberry in WASHINGTON and was relatively abundant during the spring in Snohomish, Skagit and Whatcom Counties, where it is one of the potato virus vectors. Green peach aphid got off to a slow start in Washington because of cool weather during part of the spring, but became abundant on potatoes the last half of June in the eastern portion of the State. There was considerable direct feeding damage to Russet Burbank during the period July 1-22, at which time hot weather gradually depleted populations. Light populations of potato aphid occurred on potatoes in Siskiyou and San Benito Counties, CALIFORNIA, during the 1960 season.

An APHID (Trifidaphis phaseoli) was an unusual root pest on bell pepper in Henderson County, NORTH CAROLINA, during June 1959.

BROWN STINK BUG (Euschistus servus) was light on tomatoes in GEORGIA during the 1960 season; however, in some years this species is a serious pest of commercial tomatoes in the State. LEAF-FOOTED BUG (Leptoglossus phyllopus) and STINK BUGS (Euschistus spp.) caused extensive damage to tomatoes in East Baton Rouge Parish, LOUISIANA, during July. Leaf-footed bug also heavily infested eggplant in the State. Populations of LYGUS BUGS (Lygus spp.) were moderate on some potatoes in SOUTH DAKOTA during 1960. Various LEAFHOPPERS developed medium infestations on potatoes in Riverside and Siskiyou Counties, CALIFORNIA.

HORNWORMS (Protoparce spp.) were heavy on tomatoes in GEORGIA near harvest, and the first adult of the 1960 season in DELAWARE was taken in a blacklight trap in Sussex County the last week of May. On June 1, the first hornworm egg was found on potatoes in the same county. Larvae became fairly common on peppers, potatoes and tomatoes in Kent and Sussex Counties, Delaware, during June, July and August and caused considerable feeding injury. Mature larvae of TOMATO HORNWORM (P. quinquemaculata) were present on tomatoes in the Kingston area of RHODE ISLAND during mid-August. Hornworms were very abundant on tomatoes in INDIANA during the season. Parasitism by a braconid parasite (Apanteles congregatus) was so high (90-95 percent) that damage during August to tomato fruit and foliage was not as severe in Indiana during 1960 as in 1959. Hornworm populations were as high as 2 per tomato plant in some home gardens in eastern ILLINOIS during early September. Tomato hornworm caused light losses to tomatoes in eastern COLORADO and caused almost normal damage to tomatoes and potatoes in UTAH during the 1960 season. Larvae of hornworms caused only minor damage to chili and tomatoes throughout NEW MEXICO during 1960. Tomato hornworm was present in some tomato-growing areas of CALIFORNIA during the 1960 season but was not as serious as during 1959.

Medium infestations of a LOOPER (Pseudoplusia includens) developed on tomato plantings in the San Diego area of San Diego County, CALIFORNIA, which is apparently a new host record for this species.

High populations densities of POTATO TUBERWORM (Gnorimoschema operculella) were commonly encountered on potatoes in VIRGINIA during 1960, but the pest was rare in fields of potatoes in southwestern UTAH at harvest. Populations of potato tuberworm varied light to heavy in CALIFORNIA from Riverside to Madera Counties and also infested tomatoes in Riverside and Santa Barbara Counties.

Local, heavy infestations of TOMATO PINWORM (Keiferia lycopersicella) developed in some fields of tomatoes in San Diego County, CALIFORNIA. VARIEGATED CUTWORM (Peridroma saucia) contributed to losses on potatoes in COLORADO, but controls aided in keeping these losses at a low level during the year.

COLORADO POTATO BEETLE (Leptinotarsa decemlineata) populations and damage were only light in MAINE during 1960, and these only in one area of Aroostook County. The pest has been relatively rare in the State since the general use of DDT in 1948. Adults of Colorado potato beetle were very active in RHODE ISLAND late in May and during early August, with damage being especially severe in August. The pest was unusually prevalent in CONNECTICUT during 1960. As in previous years, it remained confined to small truck farms in DELAWARE, where it was abundant on tomatoes and potatoes, causing serious feeding injury during late May, June and early July in southern sections of the State. The pest was occasionally troublesome in a few large commercial fields of potatoes, but controls were effective. Colorado potato beetle was light to moderate on commercial acreages of tomatoes and potatoes in MARYLAND during 1960, but considerably more abundant on these crops in home gardens. In VIRGINIA, a fairly large second brood appeared on late potatoes.

First-generation adults of Colorado potato beetle began to emerge in Duplin County, NORTH CAROLINA, late in May and injury to potatoes was reported in Hoke County as early as mid-May, but not over 5 percent of plants were infested. Of 42 gardens visited in Wayne County in mid-June, not one evidenced injury by this pest. Only one gardener reported any injury had been seen during the 1960 season. In the western area of North Carolina, many adults were reported on potatoes in Henderson County. Colorado potato beetle was light to heavy on tomatoes in GEORGIA and one field of potatoes in LOUISIANA was heavily infested during May, requiring treatment.

Populations of Colorado potato beetle were heavy on potatoes in the North Platte area of NEBRASKA early in August and were light to moderate on garden plots of potatoes in SOUTH DAKOTA during 1960. In NORTH DAKOTA, populations were generally low or nonexistent; however, moderate defoliation was observed in a few fields. Normal populations of Colorado potato beetle occurred in commercial areas of MONTANA during the 1960 season and the pest caused only local damage in Weber and Davis Counties, UTAH, also being present at Kanab, Kane County. Colorado potato beetle first appeared on seedling nightshades in WASHINGTON during 1960, becoming a pest throughout the summer and, unlike most years, did not disappear during the hot weather of late July.

Adults of THREE-LINED POTATO BEETLE (Lema trilineata) averaged 1-2 per plant in a small field of potatoes in Sussex County, DELAWARE, during late April, with fairly heavy feeding injury. Adults of the pest first appeared during late May in fields of potatoes in the southern area of RHODE ISLAND. New-generation larvae were abundant, causing damage by late June, and mature larvae and new-generation adults severely damaged potato foliage on August 1. Three-lined potato beetle continues to be an important economic pest of potatoes in southern areas of Rhode Island.

TOBACCO FLEA BEETLE (Epitrix hirtipennis) damaged young tomato plantings in Yolo, Sutter and San Joaquin Counties, CALIFORNIA. Also in California, DARKLING BEETLES (Blapstinus spp. and Metaponium spp.) developed local, medium to heavy infestations on peppers and tomatoes in Orange, Yolo, Sutter and Contra Costa Counties; and PEPPER WEEVIL (Anthonomus eugenii) damaged pepper plantings in Orange and San Diego Counties.

PACIFIC COAST WIREWORM (Limonius canus) was damaging to potatoes in WASHINGTON during the 1960 season near Winchester, Grant County, during September and October. This is the first record of this wetland species of wireworm in the Columbia Basin Irrigation Project.

VINEGAR FLIES (Drosophila spp.) were a serious problem around tomato canneries in MARYLAND late in the 1960 season. A VINEGAR FLY (D. melanogaster) built up rapidly during the latter part of the tomato season in INDIANA and developed one of the most serious infestations to occur in the State. Egg counts taken on cut fruit were nearly all positive, ranging up to 500 during the period of August 20 through September 15. The period was characterized by high humidity, heavy plant growth and moderate temperatures in Indiana. In UTAH, a moderate population of D. melanogaster was present in fields of tomatoes during the 1960 season.

TOMATO RUSSET MITE (Aculus lycopersici) was present in an occasional spotty infestation in fields of tomatoes in Luna and Dona Ana Counties, NEW MEXICO, during the 1960 season and caused no appreciable damage. However, the pest required treatment during July and August in Sacramento, Yolo and San Joaquin Counties, CALIFORNIA. Also in California, a SPRINGTAIL (Entomobrya unostrigata) was particularly damaging to seedling tomato plants in Yolo County.

Insects Attacking Cucurbits: Damage by MELON APHID (Aphis gossypii) to cucumbers, squash and cantaloups in UTAH was nearly normal during the 1960 season and the pest damaged one or more types of truck crops in OKLAHOMA to a limited extent. In DELAWARE, colonies of melon aphid were present to common on squash and cantaloups in all areas during late July and August, but did not build up to considerable numbers this season.

Infestations of, and damage by, SQUASH BUG (Anasa tristis) were light on squash in Cumberland County, MAINE, during the season, and adults and nymphs were common in a field of squash and cantaloups in Kent County, DELAWARE, during late August. Squash bug was again abundant throughout much of INDIANA after being scarce for 5 years. In the pumpkin-producing area and in Jackson and Scott Counties, the pest caused some losses and was quite abundant around Lafayette, Tippecanoe County. Good growing conditions for cucurbits and the late development of squash bug probably forestalled serious losses in the Lafayette area. Squash bug was present in all stages over ILLINOIS during July. In OKLAHOMA, the pest caused a limited amount of damage to one or more types of truck crops. Squash bug damaged squash and cantaloup plants in fields near Los Lunas, Valencia County, NEW MEXICO, and caused less than normal injury to susceptible crops in UTAH during 1960. Adults of HORNED SQUASH BUG (A. armigera) were present to common on cucumbers, watermelons and pumpkin squash in Sussex County, DELAWARE, during June and July and late in September. In NEVADA, moderate to heavy numbers of a FLEAHOPPER (Spanogonicus albofasciatus) occurred on cantaloups in Clark County.

Larvae of ARMYWORM (Pseudaletia unipuncta) were abundant early in August in a field of watermelons in Sussex County, DELAWARE, and caused considerable damage by feeding on the rinds. SQUASH VINE BORER (Melittia cucurbitae) was very abundant on certain varieties of squash in INDIANA, with 50 percent of the vines in some plantings being infested. Heavy infestations of this pest were observed on squash at Baker, East Baton Rouge Parish, LOUISIANA, and at least one-fourth of the plants showed signs of wilting due to this insect. No infestations of PICKLEWORM (Diaphania nitidalis) were found on cucumbers in Tangipahoa Parish, LOUISIANA, where serious damage was recorded during 1959. Light to medium infestations of a LEAF ROLLER (Platynota stultana) were present in some melons in ARIZONA during the spring of 1960.

SQUASH BEETLE (Epilachna borealis) was the only insect noted on cucumbers in the Wayne County, NORTH CAROLINA, home garden survey during 1960. Infestations of this beetle were general on cucumbers, squash and beans in Catahoula and West Carroll Parishes, LOUISIANA, during June, and were heavy on squash and pumpkin at Baker, East Baton Rouge Parish. In ARIZONA, unspecified species of DARKLING BEETLES damaged melon rinds in some cases where they touched the ground.

Insects Attacking Crucifers: IMPORTED CABBAGEWORM (Pieris rapae) was medium to heavy on cabbage in Santa Cruz and Solano Counties, CALIFORNIA, during the year. The pest infested commercial broccoli and cauliflower plantings in the Gresham-Woodburn-Hillsboro areas of OREGON late in September, and injury by this species was nearly average in UTAH for the season. Eggs of imported cabbageworm were first observed hatching on cabbages in Dane County, WISCONSIN, about July 8. Populations remained low over most of the State and not until the latter part of August were any substantial increases noted. Imported cabbageworm was destructively abundant on cabbage and related crops in INDIANA during July and August, and was light to moderate on cabbage in GEORGIA during the season. High population densities were commonly encountered on broccoli in VIRGINIA during 1960 and the pest was extremely abundant on cabbage in all sections of MARYLAND during the summer. Adults of imported cabbageworm were common by mid-April over DELAWARE. Larvae were present on cabbage and horseradish during late April, May and June, and became abundant on these crops by early July, causing moderately heavy feeding injury. From late July through October, larvae were common on cauliflower over Delaware. Imported cabbageworm was one of the major pests of crucifers in CONNECTICUT during 1960, particularly late in the season, and was generally present throughout MAINE on cole crops. Infestations reached a high level in Maine about mid-July following heavy adult flights in early to mid-June. Severe damage was reported from Cumberland County, moderate to severe damage in Androscoggin and Kennebec Counties and light to moderate injury occurred elsewhere in Maine on poorly treated or untreated plantings.

CROSS-STRIPED CABBAGEWORM (Evergestis rimosalis) infested cabbage and Swiss chard in the southern area of ILLINOIS during July.

Larvae of DIAMONDBACK MOTH (Plutella maculipennis) lightly injured horseradish in Kent County, DELAWARE, during early June, and cabbage in Sussex County during late June and early July. High populations of the pest were common on broccoli in VIRGINIA during the season, but numbers were light on cabbage in GEORGIA. Diamondback moth infested 25 percent of untreated cabbage in Plaquemines Parish, LOUISIANA, during April. It infested cabbage in COLORADO and several thousand acres of mustard in central MONTANA, where treatments were applied.

CABBAGE APHID (Brevicoryne brassicae) was heavy on cole crops in ARIZONA during the spring and heavy infestations were a problem on cabbage in Lea County, NEW MEXICO. Cabbage aphid infested cabbage and cauliflower generally in CALIFORNIA, with many local infestations developing medium to heavy populations. Winged adults of cabbage aphid, migrating into broccoli, developed into scattered economic populations in the Gresham area of OREGON the week of September 25. The pest was imported into ALASKA in plants grown in other states and severely damaged cabbage and broccoli near Fairbanks. Cabbage aphid infested 50 percent of cabbage plants in St. Martin Parish, LOUISIANA, during April, and infestations on cabbage in GEORGIA ranged light to heavy during the 1960 season. Colonies of the aphid were present on cabbage in western Kent County, DELAWARE, during late May and early June, and became abundant again on cabbage in western Kent County during October.

TURNIP APHID (*Rhopalosiphum pseudobrassicae*) was moderate to heavy on turnip, cabbage, collard and other truck crops in the eastern half of OKLAHOMA, particularly during late October and November. Predators and hymenopterous parasites eventually controlled some of the heavy infestations in the Stillwater area, but generally not until up to 50 percent of the plants were killed and the remainder heavily damaged. Turnip aphid was light on turnips during March and April in St. John the Baptist Parish, LOUISIANA.

High population densities of HARLEQUIN BUG (*Murgantia histrionica*) were commonly encountered on broccoli in VIRGINIA during the 1960 season. The pest caused a limited amount of damage to one or more types of truck crops in OKLAHOMA, and damaging infestations were a problem throught the summer on cabbage in Lea County, NEW MEXICO. Infestations of harlequin bug caused some damage to truck crops throughout TEXAS during 1960, while a FALSE CHINCH BUG (*Nysius* sp.) caused economic damage to turnips in the Winter Garden area of that State.

Adults of an INTRODUCED FLEA BEETLE (*Phyllotreta cruciferae*) were present on cabbage in DELAWARE by mid-May and remained present through July and August on this crop plus cauliflower and horseradish in Kent County. Adults became very common on horseradish and cauliflower during July, causing noticeable injury. The pest was collected from cabbage in Walworth County, WISCONSIN, during mid-May, for a new State record. Medium infestations of CABBAGE SEEDPOD WEEVIL (*Ceutorhynchus assimilis*) occurred on cabbage and mustard plantings in Santa Clara County, CALIFORNIA; and the pest was collected for the first time in NORTH CAROLINA during the year.

RED TURNIP BEETLE (*Entomscelis americana*) was widely destructive to crucifers in ALASKA, on the Yukon River at Eagle and at Stevens Village and Glennallen in the Interior. Heavy infestations of VEGETABLE WEEVIL (*Listroderes costirostris obliquus*) occurred on turnips in GEORGIA during 1960.

CABBAGE MAGGOT (*Hylemya brassicae*) was generally more troublesome in NEW HAMPSHIRE during 1960 than it was during 1959, and infestations in western MONTANA were heavy during this season. Brussels sprouts and cabbage were infested by this pest in Santa Cruz County, CALIFORNIA. Cabbage maggot occurred in extremely high populations during the spring in WASHINGTON; early plantings of cole crops being destroyed in the Lake Sammamish and Puyallup Valley areas despite repeated treatments with chlorinated hydrocarbons. In ALASKA, new areas of infestation by TURNIP MAGGOT (*H. floralis*) included Wild Lake in the Brooks Range, which is well north of the Arctic Circle. The pest was also found on kohlrabi which is not ordinarily bothered by insects.

A THRIPS (*Taeniothrips orionis*) caused injury to cabbage in the Tanana Valley of ALASKA during the 1960 season.

IMPORTED FIRE ANT (*Solenopsis saevissima richteri*) severely damaged seedling winter cabbage in St. Martin and Lafourche Parishes, LOUISIANA, during November. More than 50 percent of the fields in Lafourche Parish were infested and some growers were forced to replant portions of their fields.

Insects Attacking Beans and Peas: PEA APHID (Macrosiphum pisi) infested peas in WISCONSIN at the rate of one per 10 plants by May 25; counts had increased on peas in southern sections to about 14 per sweep by June 10. Treatment of early peas began about the first week of June, and by the middle of the month peas in southern sections had counts of 60 plus per sweep, with reinfestation of treated fields common. Late peas appeared to be favored and many of these fields had to be treated late in the season due to migration of pea aphid from early peas as well as from alfalfa. Injury by pea aphid to canning peas in UTAH was light again during 1960. Winged migrants appeared on pea and bean crops in the Willamette Valley of OREGON early in June, but populations were generally low during the season. Pea aphid was a general pest in pea-growing areas of CALIFORNIA, with infestations being present in varying degrees most of the year.

Pea aphid counts ranged as high as 50 alates and 250 apterae per 25 feet of row on English peas 3 inches high in Henderson County, NORTH CAROLINA, during the season. Numbers were generally high on peas in MARYLAND during 1960, but were again well controlled on commercial acreages. As in 1959, the pest began building up in numbers on peas over DELAWARE late in April, but only reached serious proportions in untreated fields by the end of May.

BEAN APHID (Aphis fabae) developed medium, local infestations on lima beans in Orange County, CALIFORNIA, and was a pest of beans in the Willamette Valley of OREGON beginning in July and becoming economic by mid-August. The pest was present in unusually low numbers in western WASHINGTON. Bean aphid was generally light and spotty in DELAWARE during the 1960 season. Colonies were first found in a large field of lima beans in Kent County late in June and were present in a few fields in Kent and New Castle Counties until late August. The pest was reported as causing damage to beans and black-eyed peas in several localities of VIRGINIA during 1960.

COWPEA APHID (Aphis medicaginis) was light on peas in St. John the Baptist Parish of LOUISIANA during the spring of 1960.

Adults and nymphs of RAPID PLANT BUG (Adelphocoris rapidus) were present on asparagus ferns, lima and snap beans and carrots over DELAWARE during the entire 1960 growing season, but there were no serious buildups on these crops. Also in Delaware, adults and nymphs of WHITEFLIES (Trialeurodes spp.) were abundant in a field of snap beans in New Castle County during late August and caused severe yellowing of leaves.

Two NOCTUIDS were reported infesting beans during 1960. Larvae of GREEN CLOVERWORM (Plathypena scabra) were fairly common in most fields of snap and lima beans over DELAWARE, causing very light feeding injury until late in the season. A slight increase in numbers was noted on these crops during the last half of August and early September, with moderate to moderately heavy feeding injury resulting. In NORTH CAROLINA, truckloads of wax beans were turned away from markets in Chowan County during early June because of infestations of Heliothis sp.

An infestation of COTTON SQUARE BORER (Strymon melinus) on beans in one area of the Eastern Shore of VIRGINIA is possibly the first report of the species in that area. Cotton square borer was a minor pest of beans in DELAWARE during 1960, feeding on young pods and leaves in Kent County during late June through mid-July.

LIMA-BEAN POD BORER (Etiella zinckenella) caused medium, local damage to lima beans in San Diego and Orange Counties, CALIFORNIA, and damaged snap beans in many localities of VIRGINIA during 1960. LIMA-BEAN VINE BORER (Monoptilota pergratialis) was present on beanvines in Craven County, NORTH CAROLINA, during September. LESSER CORNSTALK BORER (Elasmopalpus lignosellus), which occurs south of the Tehachapi Mountains in CALIFORNIA, caused some local damage to black-eyed peas in the State. Light to medium infestations of WHITE-LINED SPHINX (Celerio lineata) occurred on peas in Humboldt County, NEVADA, during June. PEA MOTH (Laspeyresia nigricana) infestations were much heavier in northwestern WASHINGTON during 1960 than in the previous 10-12 years.

MEXICAN BEAN BEETLE (Epilachna varivestis) was generally less abundant than usual throughout MAINE during the 1960 season. There was only one serious occurrence, this in Androscoggin and Sagadahoc Counties, where moderate to severe damage was reported on string and dry beans. The population level of Mexican bean beetle was at a very low level, generally, throughout NEW HAMPSHIRE during 1960 and extremely light infestations occurred in RHODE ISLAND.

Adults and larvae of Mexican bean beetle were generally present on snap and lima beans over DELAWARE throughout the season. In one area of Sussex County, the infestation on lima beans became very heavy, with serious feeding injury during August, September and October. Mexican bean beetle was about normal on commercial and home plantings in MARYLAND, heaviest numbers appearing on snap and lima beans during June and July; and the beetle caused heavy damage in some untreated sections of VIRGINIA.

Mexican bean beetle averaged 25 per 10 feet of untreated row in Scotland County, NORTH CAROLINA, late in May, and caused about 10 percent defoliation of lima beans in Washington County. A survey of 42 home gardens in Wayne County showed an average of 10.3 percent of the foliage of bush beans destroyed at harvest time during mid-June. Some plantings did not require insecticide applications. The pest was light to heavy on pole, snap and lima beans in GEORGIA during 1960.

Mexican bean beetle was present in moderate populations in most fields of beans in the Scottsbluff and Alliance areas of NEBRASKA and was not a serious problem in WYOMING during 1960, with very little damage occurring as controls were applied as soon as the first beetle was reported. The pest infested snap beans in COLORADO, but, as control was effective, losses were kept at a minimum. Mexican bean beetle caused heavy damage to beans in San Juan, Torrance and Taos Counties, NEW MEXICO; and caused above-normal damage in a number of northern and central counties of UTAH during 1960.

Adults of BEAN LEAF BEETLE (Cerotoma trifurcata) were first found on young snap beans in Sussex County, DELAWARE, during April and were fairly common on snap and lima beans during the growing season, causing noticeable but not serious feeding injury over the State. Generally, this pest was not as serious in Delaware as during 1959. However, more than the usual amount of foliage injury to snap beans occurred during the season in MARYLAND. High population densities of bean leaf beetle were commonly encountered on beans in VIRGINIA during 1960. Bean leaf beetle was light to heavy on pole, snap and lima beans in GEORGIA and caused heavy damage to lima beans in East Feliciana Parish, LOUISIANA. In OKLAHOMA, bean leaf beetle damaged one or more types of truck crops to a limited extent during the 1960 season.

PEA WEEVIL (Bruchus pisorum) required general control on canning peas in UTAH during 1960 and was a problem as usual in OREGON, where controls were also necessary. PEA LEAF WEEVIL (Sitona lineata) was the most abundant on peas in northwestern WASHINGTON during 1960 than it has been for the past 3-4 years. First economic damage reported in eastern Washington was on peas in the Quincy area of the Columbia Basin. A NITIDULID (Meligethes nigrescens) was a problem in Benton County, OREGON, on bush beans early in July, but populations were much reduced over those that appeared during 1959.

STRAWBERRY SPIDER MITE (Tetranychus atlanticus) was fairly abundant on snap beans in one area of Sussex County, DELAWARE, during mid-June. During late July and early August, infestations in several fields of lima beans in Kent and Sussex Counties were quite heavy, resulting in severe discoloration. MITES in general were damaging to seed crops in CALIFORNIA, with beans being one of the most severely affected crops. Also in California, BEAN THRIPS (Hercothrips fasciatus) caused nominal damage to bean crops during the 1960 season.

Insects Attacking Beets: The BEET LEAFHOPPER (Circulifer tenellus) survey during March and April in WASHINGTON showed high overwintering populations in the Yakima Valley and Columbia Basin. Conditions were favorable for a large spring development during 1960. The heaviest, early summer infestations in several years built up on sugar beets and beans in the areas. Symptoms of curly top developed on sugar beets and susceptible white varieties of beans were reduced to as low as 2 bags per acre. The spring survey for overwintering populations of the pest in the Morrow-Umatilla County breeding area of OREGON indicated a low population, with a poor host-plant relationship. As beets were emerging from the ground in the Hermiston area, however, beet leafhoppers were found to be numerous in and around field edges. It appears that field edges, roadbanks and irrigation ditchbanks support a considerable growth of beet leafhopper host plants, particularly tumblemustard (Sisymbrium altissium). These disturbed soil areas, adjacent to fields of beets, are believed to constitute the most serious threat to the infection of young beet plants by the curly-top virus, since leafhoppers move readily from these areas to the beets. Migration from the breeding area in Oregon, in most cases several miles from fields of beets, does not occur until after beets have developed to the 4-leaf stage. At this point, plant resistance to the disease is effective. Incidence of curly top in the Hermiston area of Oregon during 1960 reached 15 percent in some fields.

Populations of beet leafhopper and incidence of curly top were of little concern in NEVADA during the 1960 season and curly top caused very little damage to tomatoes, sugar beets, potatoes, beans, cucumbers, squash and other susceptible crops in UTAH, when compared with the 1958 situation. Damage to market tomatoes in Utah, however, was 25 percent in the southwestern area during 1960. Many fields of sugar beets in Washakie County, WYOMING, showed symptoms of curly top late in July. As the season progressed, many fields were badly damaged by this virus disease. Populations of beet leafhopper were light, and the highest number recorded per 100 sweeps was 3 during the week of September 2. A few fields of beets in southeastern Wyoming, near Pine Bluffs, also showed symptoms of curly top, but damage was light. Beet leafhopper caused considerable loss to sugar beets in western areas of COLORADO during the season. Controls were applied for the most part as an insurance measure and loss was kept at low levels, in comparison with previous years. The transmission of curly top caused heavy losses to tomatoes on the western slope, but controls on beans were effective and losses were at a minimum. Beet leafhopper was rather light on overwintering hosts in TEXAS, but incidence of curly top was of some concern on the high plains of that State during 1960.

LYGUS BUGS (Lygus spp.) were held at a low level in sugar beet seed fields in NEVADA by the application of insecticides and by predators during the 1960 season. Lygus elisus and Lygus spp. were abundant on sugar beet seed crops in southern and northern areas of UTAH in the spring of 1960 and were controlled. However, poor quality in sugar beet seed did result. Overwintering lygus bugs (L. elisus and L. hesperus) were extremely abundant in WASHINGTON during April and destroyed several fields of sugar beets in the Yakima Valley. Lygus bugs were also abundant and damaging in the Columbia Basin and Walla Walla areas of the State.

SUGAR-BEET ROOT APHID (Pemphigus betae) infested some fields of beets in Carbon County, MONTANA, during 1960, and another ROOT APHID (P. balsamiferae) was numerous in a few fields of beets in UTAH during the season. GREEN PEACH APHID (Myzus persicae) was low to moderate on sugar beets in WASHINGTON during 1960, with a peak about June 30. Other aphids found on sugar beets in Washington were BEAN APHID (Aphis fabae), CORN LEAF APHID (Rhopalosiphum maidis), Hyalopterus atriplicis and Pemphigus sp.

Moth flights of BEET WEBWORM (Loxostege sticticalis) were quite heavy in many areas of NORTH DAKOTA and infestations were widespread in the upper Red River Valley during 1960. Controls on sugar beets were extensive, but somewhat less than during the 1959 season. There was an estimated 50,000 acres treated in the State to protect the crops. In general, infestations of beet webworm were not severe in WYOMING during 1960, but a few scattered fields of sugar beets were damaged. Most sugar beet areas were well controlled and infestations were kept at a minimum. Numerous flights of adults were observed early in the season in Wyoming. Beet webworm was present on beets almost everywhere in COLORADO during the season, and was one of the main insects infesting lettuce. Controls were applied and losses were kept at a minimum, however. The pest also occurred on cabbage in Colorado. In NEW MEXICO, beet webworm almost completely defoliated about 30 acres of sugar beets in a field near Willard, Torrance County.

Light to medium infestations of a LEAF ROLLER (Platynota stultana) were present in some sugar beets in ARIZONA during the spring of 1960.

SPINACH LEAF MINER (Pegomya hyoscyami) caused moderate damage to beets and spinach in Cumberland County, MAINE, during the 1960 season. The first specimens of a ROOT MAGGOT (Tetanops sp.) appeared in Washakie County, WYOMING, about mid-June, with light damage occurring to sugar beet roots. In August, severe infestations were found in many fields. Washakie County was the most severely affected area, although a few fields in Big Horn County were also damaged by this pest. In UTAH, SUGAR-BEET ROOT MAGGOT (Tetanops myopaeformis) infested fields of sugar beets in the northern area during 1960. Determination made by R. H. Foote.

Insects Attacking Onions: ONION MAGGOT (Hylemya antiqua) was present in moderate numbers in Cumberland County, MAINE, during 1960, where moderate damage to onions occurred. Onion maggot caused only light injury to onion in WISCONSIN, despite ineffectual treatment in some areas. In MONTANA, infestations of the pest were generally severe during the 1960 season. Onion maggot caused some losses to onions in COLORADO, but controls kept losses at a minimum. Hylemya spp. caused high losses to green bunching onions in Adams County. Populations and damage by onion maggot in NEVADA were below 1959 levels in most fields of onions. Light to heavy damage was reported, however, in improperly treated fields or in fields treated with certain insecticides. Medium populations of onion maggot developed in the river district of Yolo County, CALIFORNIA, during the 1960 season. Populations of the pest remained below normal over OREGON during the year. Onion maggot was more numerous in the Walla Walla area of WASHINGTON during 1960 than during the past 2 years, with severe losses to untreated green or bunching onions. Good control was obtained with several new phosphate insecticides applied in the furrow as granules with the seeds in Columbia Basin and Walla Walla areas. Populations of onion maggot were of minor importance in ALASKA during 1960 as compared with 1959.

PEA LEAF MINER (Liriomyza langei) was noted as a serious pest of onions for the first time in OREGON during 1960, with maggots causing considerable top damage. At Wapato, Yamhill County, 100 percent of the leaves was infested and a large amount of wilting occurred; and at Labish, Marion County, as in other Willamette Valley onion-growing areas, reduction in onion size was anticipated due to the attack of this pest.

ONION THRIPS (Thrips tabaci) was medium to heavy on onions in the Winter Garden and lower Rio Grande Valley areas of TEXAS during the year; caused losses to onions in COLORADO; and caused below-average injury to onions in UTAH where it also occurred on other crops. In NEVADA, onion thrips heavily damaged onions in Clark County during April and caused light to heavy damage to dry onions and garlic in Lyon, Pershing and Washoe Counties during June and July. Onion thrips infested onions generally in CALIFORNIA during 1960, with considerable damage occurring to some local plantings. Other THRIPS (Frankliniella occidentalis and other species) were heavy on spring onions in ARIZONA during 1960.

BROWN WHEAT MITE (Petrobia latens) was abundant in fields of onions in Marion County, OREGON; and infestations ranged light to heavy on garlic and onions in Lyon and Washoe Counties, NEVADA, during May and June, when controls were required. Also in Nevada, ARMY CUTWORM (Chorizagrotis auxiliaris) caused light to heavy damage to onions in Humboldt County and a STEM AND BULB NEMATODE (Ditylenchus dipsaci) infested garlic in Lyon and Washoe Counties.

Insects Attacking Asparagus: Adults of ASPARAGUS BEETLE (Crioceris asparagi) were present in asparagus plantings in RHODE ISLAND early in June, but were numerous by late April on asparagus spears over DELAWARE, causing noticeable feeding injury. Eggs were also present at this time in Delaware. In mid-July, adults were very common and larvae were prevalent on asparagus ferns in Kent County, Delaware. Populations of the pest were about normal on commercial and home plantings of asparagus in MARYLAND during the 1960 season. Asparagus beetle and SPOTTED ASPARAGUS BEETLE (C. duodecimpunctata) caused below-normal damage to the crop in northern and central counties of UTAH during the season, but both species caused heavy damage to asparagus, generally, west of the Continental Divide in MONTANA.

Both TOBACCO THRIPS (Frankliniella fusca) and ONION THRIPS (Thrips tabaci) were rather abundant on asparagus spears in New Castle County, DELAWARE, during mid-June, with onion thrips being the more abundant of the two.

BROWN WHEAT MITE (Petrobia latens) caused local damage to asparagus in Orange County, CALIFORNIA, during April and May; and an unidentified CICADA caused considerable damage to asparagus planted in the Coachella Valley in Riverside County.

Insects Attacking Lettuce: CABBAGE LOOPER (Trichoplusia ni) was heavier and earlier than normal on spring lettuce in the Aguila area of Maricopa County, ARIZONA, and counts averaged one small larva per plant early in April. In fall lettuce, egg counts were high during October, but control was very successful. Damage by this pest was held to a minimum on lettuce in Dona Ana County, NEW MEXICO, during 1960 because of adequate control measures. Cabbage looper was one of the chief insects infesting lettuce in COLORADO, but controls kept losses at a minimum. Spring infestations of BEET ARMYWORM (Spodoptera exigua) on lettuce were low statewide and of little significance in ARIZONA during 1960. Fall numbers of the pest were light but sufficient to require control in some instances. VARIEGATED CUTWORM (Peridroma saucia) was a problem in a few locations of CALIFORNIA during 1960, with most damage occurring to lettuce plantings.

TARNISHED PLANT BUG (Lygus lineolaris) caused light damage to lettuce in Aroostook and Cumberland Counties, MAINE, during the year. Injury from feeding developed into necrotic spots which became holes following leaf growth. Infestations of GREEN PEACH APHID (Myzus persicae) were light in central and southwest ARIZONA during March and THRIPS (Frankliniella occidentalis and others) were heavy on spring lettuce in the State during the 1960 season.

Insects Attacking Sweetpotatoes: Infestations of SWEETPOTATO WEEVIL (Cylas formicarius elegantulus) are known to occur in ALABAMA, FLORIDA, GEORGIA, LOUISIANA, MISSISSIPPI, SOUTH CAROLINA and TEXAS. During 1960, a total of 775 properties were placed under regulation and 592 properties were released from regulation. The attention of the Plant Pest Control Division was directed principally to survey and supervision of the grower insecticide program. Growers treated 1,279 seedbeds, 12,525 acres of plantings and 1.7 million bushels of sweetpotatoes when placed in storage.

SWEETPOTATO FLEA BEETLE (Chaetocnema confinis) caused extensive damage to young sweetpotato transplants in VIRGINIA and counts averaged 60 per 50 sweeps during June and July in LOUISIANA.

Adults and larvae of MOTTLED TORTOISE BEETLE (Deloyala guttata), GOLDEN TORTOISE BEETLE (Metriona bicolor) and another TORTOISE BEETLE (Agroiconota bivittata) were prevalent on sweetpotatoes and yams in Kent and Sussex Counties, DELAWARE, during July and caused moderately heavy feeding injury. Golden tortoise beetle was unusually numerous in some fields of sweetpotatoes in VIRGINIA and A. bivittata was quite common in all fields of sweetpotatoes in LOUISIANA.

Large numbers of FALL ARMYWORM (Laphygma frugiperda) were collected in fields of sweetpotatoes in LOUISIANA during the season but were probably feeding largely on grasses; however, some damage to sweetpotato foliage was noted. Larvae of this pest averaged 75 per 100 sweeps in 6 fields of sweetpotatoes examined in St. Landry Parish.

Two adults of SWEETPOTATO HORNWORM (Agrius cingulatus) were collected in a blacklight trap at Bridgeville, Sussex County, DELAWARE, on September 26 and 27 (one each night) for a first record of this species in the State.

Insects Attacking Carrots: Larvae of CELERYWORM (Papilio polyxenes asterius) were first found on carrots during mid-June in New Castle County, DELAWARE, and became common by mid-July, with light feeding injury. Although still a minor pest of carrots in the State, numbers increased considerably on this crop over those present during the 1959 season. In NEVADA, light to heavy damage was caused to carrots by ARMY CUTWORM (Chorizagrotis auxiliaris) in Humboldt County.

Insects Attacking Mint: The first BLACK CUTWORM (Agrotis ipsilon) of the season in OREGON was collected on mint at Talbot, Marion County, on June 24 and VARIEGATED CUTWORM (Peridroma saucia) built up to economic numbers in fields of mint in the Willamette Valley during July. A MINT CUTWORM (Heliothis phloxiphaga) damaged spearmint and peppermint in the lower Yakima Valley of WASHINGTON during the spring of the year. Several species of CUTWORMS were common during the spring of 1960 in INDIANA and caused significant losses to mint in that State.

ALFALFA LOOPER (Autographa californica) built up to economic numbers in fields of mint in the Willamette Valley of OREGON during July. Another LOOPER (Rachiplusia ou) was less abundant in INDIANA during 1960 than the past two seasons. A late infestation developed during August on second-growth mint, but was of little economic importance. A number of parasites and diseases were found in fields of mint in Jasper and Starke Counties. Of these, a nuclear polyhedrosis virus disease was isolated from a large number of loopers collected from commercially grown mint in Indiana. The disease was of epizootic proportion in the looper populations and was bringing about adequate reduction in numbers.

An APHID (Phorodon menthae) was collected on spearmint in Arlington County, VIRGINIA, and Camden County, NEW JERSEY, for first records of this species in both states.

STRAWBERRY ROOT WEEVIL (Brachyrhinus ovatus) caused heavy damage to peppermint during the spring of 1960 in the Yakima Valley of WASHINGTON where soil treatments were not applied.

STRAWBERRY SPIDER MITE (Tetranychus atlanticus) severely damaged 155 acres of peppermint in Jefferson County, OREGON, during early July.

Insects Attacking Small Berry Truck Crops: STRAWBERRY LEAF ROLLER (Ancylis comptana fragariae) infested strawberries in IOWA during 1960 and pupae were found as far north in WISCONSIN as Door County by May 27. Populations increased rapidly and were more common than normal in most sections of Wisconsin during the year. Infestations of strawberry leaf roller in ARKANSAS during 1960 were similar to those present in the State during 1959. The pest caused little injury in northeastern KANSAS where controls were applied, but rolled leaves were easily found in all plantings in the south central area of the State where little or no control was applied. Heavy infestations of strawberry leaf roller occurred in Modoc County, CALIFORNIA. Strawberry leaf roller and other leaf rollers caused normal injury in north central communities of UTAH during the year and STRAWBERRY CROWN MOTH (Ramosia bibionipennis) infested dewberry and raspberry canes at Providence. Strawberry crown moth appears to be building up in the Willamette Valley of OREGON, with 6 counties reporting infestations in commercial fields during the 1960 season; 5-25 percent of the plants were damaged in several fields. Strawberry crown moth caused severe damage in one local area of Humboldt County, CALIFORNIA, but only light damage by LESSER CORNSTALK BORER (Elasmopalpus lignosellus), to strawberry plantings, was reported in local areas of Orange and San Diego Counties during October. Heavy populations of WESTERN TUSSOCK MOTH (Hemerocampa vetusta) occurred on strawberries in the Watsonville area of Santa Cruz County, California.

ORANGE TORTRIX (Argyrotaenia citrana) was a pest of strawberries in Santa Barbara and Santa Cruz Counties, CALIFORNIA, where heavy infestations developed. OMNIVOROUS LEAF TIER (Cnephasia longana) appeared on strawberries in the Willamette Valley and on raspberries in Multnomah and Marion Counties, OREGON, in what appeared to be abnormal numbers during the 1960 season. OBLIQUE-BANDED LEAF ROLLER (Archips rosaceanus) infested scattered plantings of blackberries in the mid-Willamette Valley of OREGON, with prolonged cool weather in the spring slowing larval development and thus creating a contamination problem at harvest; however, populations were not above normal. Oblique-banded leaf roller infested strawberries in IOWA during 1960, and was unusually abundant on raspberries in the Hudson Valley of NEW YORK and in NEW HAMPSHIRE. Another LEAF ROLLER (Choristoneura parallela) occurred on strawberries in DELAWARE during 1960 for a new record of that species in the State.

STRAWBERRY WEEVIL (Anthonomus signatus) was present in moderate numbers on strawberries at various localities in Wicomico and Somerset Counties, MARYLAND, during late April and early May, and was generally present in old or renovated plantings in MINNESOTA during the season. Infestations of strawberry weevil and STRAWBERRY CROWN BORER (Tyloderma frageriae) present in ARKANSAS during 1960 were similar to those of 1959. STRAWBERRY ROOT WEEVIL (Brachyrhinus ovatus), another ROOT WEEVIL (B. rugosostriatus) and sometimes BLACK VINE WEEVIL (B. sulcatus) damaged untreated strawberry patches in central and northern UTAH and caused local injury to roots of raspberries in the State. Heavy, local infestations of a WEEVIL (B. cribricollis) developed in strawberry plantings in Orange County, CALIFORNIA.

A CARRION BEETLE (Silpha ramosa) caused up to 2 percent damage to strawberry fruit in the Manteca area of San Joaquin County, CALIFORNIA, where steer manure was used as fertilizer.

ROSE STEM GIRDLER (Agrilus rubicola) damaged raspberry plantings in Utah, Box Elder, Salt Lake and Davis Counties, UTAH, during the season. First-generation adults of a SAP BEETLE (Lobiopa insularis) began moving into fields of strawberries in Tangipahoa Parish, LOUISIANA, the first of May and about 3 percent of plants examined were infested by the end of the month.

MEADOW SPITTLEBUG (Philaenus leucophthalmus) was common on strawberries and raspberries in southeastern ALASKA during the 1960 season, having originally been introduced from out of State. Meadow spittlebug began hatching the first week of April in the Willamette Valley of OREGON. Nymphs reached maturity by May 21 on strawberries and appeared above normal in abundance. Up to 20 egg masses per 10 plants were counted in 12 fields.

STRAWBERRY APHID (Pentatrichopus fragaefolii) developed light to medium infestations in Orange County, CALIFORNIA, from January through March.

Larvae of RASPBERRY SAWFLY (Monophadnoides geniculatus) were quite common on raspberries in the Dane County area of WISCONSIN during the 1960 season.

Populations of CYCLAMEN MITE (Steneotarsonemus pallidus) increased on strawberries over 1959 levels in the Twin City area of MINNESOTA and areas to the north during mid-June. The pest was also a problem in CALIFORNIA to strawberry growers in Santa Barbara County and in a few local areas in Sacramento County during the 1960 season.

SPIDER MITES (Tetranychus spp.) averaged over 10 per leaf in a large planting of strawberries at Salisbury, MARYLAND, late in April and injured new plantings in Somerset and Wicomico Counties during July. In INDIANA, fields of strawberries were treated against infestations of a SPIDER MITE (T. lobosus). Another SPIDER MITE (T. mcdanieli) damaged raspberry foliage in some counties of UTAH. TWO-SPOTTED SPIDER MITE (T. telarius) was common on strawberries in the Matanuska and Tanana Valleys of ALASKA during the 1960 season.

MILLIPEDES fed extensively on ripe strawberries in Lincoln County, NEBRASKA, and SLUGS were common on strawberries and raspberries in southeastern ALASKA during 1960.

Insects Attacking Miscellaneous Truck Crops: Several miscellaneous crops were infested or damaged in CALIFORNIA during the 1960 season. ARTICHOKE PLUME MOTH (Platyptilia carduidactyla) was a continuing problem throughout the 1960 season, with up to 25 percent bud damage occurring where treatment timing varied. Medium to heavy infestations of a WEEVIL (Brachyrhinus cribricollis) developed on artichoke plantings in the Castroville area of Monterey County. An APHID (Anuraphis apiifolia) was not as prevalent in celery-growing areas of California during the 1960 season as during 1959, but a MITE (Tyrophagus dimidiatus) damaged spinach plantings in Orange and Yolo Counties during the season.

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TOBACCO INSECTS

HORNWORMS (Protoparce spp.) damaged tobacco in many VIRGINIA localities and were about normal for the year in MARYLAND. The first hornworm adult was trapped in NORTH CAROLINA at Oxford on May 2, and the first egg of a hornworm was found on May 24 in Pitt County. The total average leaf loss in farmers' fields during the year in North Carolina, attributable to this pest and Heliothis spp., was $5.81 per acre. Hornworm infestations were light to moderate in GEORGIA, but not much of a problem in TENNESSEE. The Georgia infestations were greater than an average year, however.

TOBACCO BUDWORM (Heliothis virescens) damaged tobacco in many VIRGINIA localities and was the most serious tobacco pest of the year in TENNESSEE. The pest was present over most of the tobacco-growing areas of Tennessee and controls were persistently applied. Infestations in GEORGIA were light to heavy during the season. BUDWORMS (Heliothis spp.) were generally below normal on tobacco in MARYLAND and parasitism was noted several times.

YELLOW-STRIPED ARMYWORM (Prodenia ornithogalli) was present on tobacco at Sandgates, St. Marys County, MARYLAND; and CABBAGE LOOPER (Trichoplusia ni) infestations were light to moderate on tobacco late in the season in GEORGIA. BLACK CUTWORM (Agrotis ipsilon) injured burley tobacco in the western areas of

NORTH CAROLINA by cutting off leaves during mid-July; and the pest occurred in outbreak proportions on newly set tobacco in MARYLAND during June when replanting became necessary in several instances. TOBACCO MOTH (Ephestia elutella) began its summer flight in tobacco warehouses in NORTH CAROLINA during the first two weeks of June.

GREEN PEACH APHID (Myzus persicae) was light to heavy on tobacco in the plant bed and in the field in GEORGIA and infestations on maturing tobacco reached economic levels in late July in MARYLAND. Treatment by air was general during the first half of August in the latter State. The pest also damaged tobacco in some VIRGINIA localities.

BROWN STINK BUG (Euschistus servus) damaged tobacco locally in VIRGINIA and SOUTHERN GREEN STINK BUG (Nezara viridula) caused light, localized infestations in GEORGIA tobacco. In 1957 and 1958, this pest was serious in the latter State.

SEED-CORN MAGGOT (Hylemya cilicrura) caused severe damage to early set tobacco in CONNECTICUT. Insecticide treatments did not adequately protect the plants and resetting of plants was necessary in some instances.

TWO-SPOTTED SPIDER MITE (Tetranychus telarius) severely injured margins of a field of tobacco in Wayne County, NORTH CAROLINA, during July. As far as is known, this is the first record of attack of tobacco by spider mites anywhere in the world.

TOBACCO FLEA BEETLE (Epitrix hirtipennis) was light to moderate on tobacco in the plant bed and infestations were light to heavy in the field in GEORGIA. In VIRGINIA, this flea beetle is of major importance in the tobacco-growing counties and in 1960 it was the most important species attacking flue-cured tobacco. The second brood was particularly heavy in some counties. Tobacco flea beetle numbers in MARYLAND were considerably above those of 1959; population peaks were noted in late May to early June, mid-July and mid-August. GREEN JUNE BEETLE (Cotinis nitida) larvae were responsible for uprooting tobacco plants in beds at localities in Charles and Prince Georges Counties, MARYLAND; and a few reports of larvae attacking plant beds were reported in VIRGINIA. An undetermined WIREWORM caused light to moderate damage to transplanted tobacco plants in GEORGIA; apparently insecticide was not used in the transplant water. VEGETABLE WEEVIL (Listroderes costirostris obliquus) was light to moderate on tobacco in the plant bed in GEORGIA.

GRASSHOPPERS caused some damage to tobacco in TENNESSEE and a SPRINGTAIL caused some concern to tobacco growers in GEORGIA by infesting plant beds. However, little springtail damage occurred in Georgia except to tobacco plants which were just emerging.

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COTTON INSECTS

Several cotton insects were of economic importance during 1960. Of these, boll weevil and bollworms appeared to be the most important; however, cotton square borer, lygus bugs and thrips were also damaging to cotton in certain areas and required controls. The fall trash examinations to determine the number of hibernating boll weevils indicate that there was a general increase in the number entering hibernation in the fall of 1960 compared with that of 1959. For details of this survey see CEIR 10(50):1125, CEIR 11(1):4 and CEIR 11(4):36.

BOLL WEEVIL (Anthonomus grandis) infestations were heavy in GEORGIA during 1960 as has been the case in the past 3-4 years. The infestations in the middle and northern areas of this State, for the most part, were heavy; however, in the past 3-4 years, the infestations in these areas of Georgia have not been nearly as severe as those in the southern area. In TENNESSEE, numbers were large at the outset of the season in the southern one-third of the major cotton-producing area. Surveys have shown that in this area of chronic infestation, 80 percent or more of the growers apply controls with generally satisfactory results. In ARKANSAS, a comparatively higher percentage of fields was infested in early 1959 than in 1960, which reflects the early planting of the crop. Considering the lateness of the planting date and the percent of fields infested, it appears that 1960 could have been a serious boll weevil year. Dry weather helped hold down infestations, yet the percent of fields infested, in general, was greater after the first week of July than in 1958 and 1959. The percent of infested Arkansas fields ranged from 7.6 to 94.4 between the third week in June to the first week in September. The average percent of punctured squares ranged from 0.6 to 21.3 between the same dates. The highest percent punctured squares was during the fourth week of August. Light boll weevil infestations appeared in LOUISIANA in early June and began to increase in older cotton by the end of June. By August, infestations in that State were general and some migration was reported.

Boll weevil infestations in TEXAS were medium to heavy in many areas, with a heavy buildup noted late in the season. In OKLAHOMA, infestations remained generally lighter during 1960 than they were in 1959 although the first adult was found in the southeast area 3 weeks earlier (May 27) than noted in the same section in 1959. The pest continued to be a major one in all cotton-producing sections of Oklahoma during the year, but populations developed much later than normal. The latter condition was probably due mainly to the overall lateness of the cotton crop. Although the overall infestation was down somewhat, localized "hot spots" were considerably higher than normal. Counts in some research plots in the Stillwater area were the highest that have been recorded in that locality during the past 5 years. Boll weevil surveys in NEVADA during 1960 were negative.

Infestations of PALE-STRIPED FLEA BEETLE (*Systena blanda*) were heavy on seedling cotton in the Griffin area of GEORGIA and heavy populations occurred in some fields in Clark County, NEVADA, where damage was most apparent on the leaves, bracts and buds. Infestations of *Systena* sp. averaged 2 per 10 sweeps in some Yuma County, ARIZONA, cotton in July and August. BLISTER BEETLES were a problem in cotton fields in Lea County, NEW MEXICO, during June and July.

Infestations of BOLLWORMS (*Heliothis* spp., et al) were very heavy in GEORGIA. Egg counts ran as high as 500 per 100 terminals and larval counts reached 126 per 100 terminals. The first eggs were noted on April 30. For the past 3 years, eggs and larvae have been found earlier each season in Georgia. Bollworms were heavier in ARKANSAS in both 1958 and 1960 than they were in 1959. In 1960, however, infestations, as measured by percent of fields infested, numbers of larvae present, persistence of infestations and difficulty with control, are considered to be probably the heaviest infestations ever experienced in the State. The percent of fields infested in Arkansas ranged from 19.9 to 80 between the third week in June and the first week in September. *Heliothis zea* and *H. virescens* both infested cotton in Arkansas, with *H. zea* being the most abundant. During June, in LOUISIANA, heavy deposits of *H. virescens* eggs were found in several areas of the State on cotton and required control. Infestations of *H. zea* in terminals were general in all areas of Louisiana in August, and by September eggs were being deposited on all growing parts of the plants.

Bollworms caused heavy damage throughout the cotton-growing areas of TEXAS and infestations presented a rather erratic picture during 1960 in OKLAHOMA. Generally, despite seemingly favorable weather conditions for population buildups in Oklahoma, only certain areas (central and south central) experienced above normal infestations. Counts in southeast Oklahoma were lighter throughout the season than 1959, while the southwest area recorded approximately the same degree of infestation (6-10 percent) as recorded in 1959. In the Chickasha area of Oklahoma, larval infestations averaged 17 percent for a 7-week period in untreated cotton in research plots during August and September.

Continuous generations of Heliothis zea made it necessary to treat cotton at regular intervals in NEW MEXICO from mid-June until October in the majority of the cotton fields in Chaves, Eddy and Lea Counties. Losses to cotton by bollworms were kept to a minimum where effective control measures were used. Light to moderate infestations were noted in other areas of New Mexico and some control was needed. Infestations of bollworms remained low statewide in ARIZONA, except in a few local cases, until early September, when counts averaged 3-4 larvae per 100 terminals in most cotton-growing areas. Damage during the September increase in Arizona was not heavy and 1960 can be considered a light year. Infestations and damage by bollworms in Nye County, NEVADA, were equal to the 1959 high, but were very light in comparison with the other cotton-growing areas of the State. Light bollworm populations were present early in CALIFORNIA cotton and remained fairly static until late summer when populations exploded and considerable treatment was required. Populations remained high until late in the fall. All cotton-growing areas of California were affected.

PINK BOLLWORM (Pectinophora gossypiella) does not occur in CALIFORNIA, but it occupies the primary interest of detection and survey by all cooperative agencies. All means of detection are employed in the constant vigilance. Intensive inspection of 9,253,473 blossoms, 332,749 green bolls, 70,354 bushels of gin trash, collections from 139 Argon light traps operating for 53,220 light nights, and 7,845 lint cleaner inspections were negative for pink bollworm during 1960 in California. Surveys for this pest in NEVADA were also negative. Pink bollworm collections in light traps indicated a general emergence of moths in central ARIZONA during April, with most emergence occurring during the first half of the month. One moth was also collected in Yuma County, Arizona, but no established infestation was found. In the central area of the State, 31,000 acres were treated with insecticide beginning in late May and ending in late July. Most of the acreage received 9 applications. Fall inspections have shown only very light infestations on a small acreage in the central area that was treated. Light, but general, infestations were present in Graham County which was not in the insecticide treatment area. Through January 27, 1961, the cumulative bushels of gin trash examined totaled 239,629 and 217 pink bollworm larvae were recovered. Surveys through January 1961 had located the following infestations in Arizona.

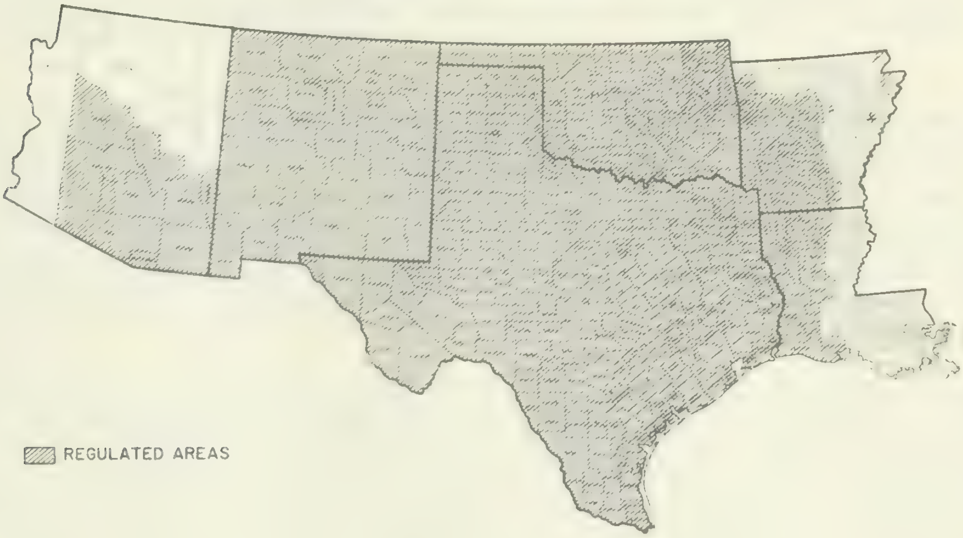
County	Number of Locations	Number of Properties	Acres Infested
Central Arizona			
Maricopa	6	12	548
Pima	2	4	880
Pinal	5	24	1,493
Total	13	40	2,921
Eastern Arizona			
Cochise	2	9	713
Graham	12	52	2,230
Greenlee	3	4	29
Total	17	65	2,972
State Total	30	105	5,893

There was no appreciable early buildup of pink bollworm in cotton fields in southern Dona Ana County, NEW MEXICO, as there was in 1959. There was a slight buildup during October, however. Infestations in fields which were estimated at 75-90 percent infested bolls in 1959 ran less than 10 percent and damage was confined almost entirely to the terminal bolls. Pink bollworm did not present a serious problem in TEXAS during 1960 and only limited damage occured in OKLAHOMA.

Gin trash surveys for pink bollworm recovered 3 larvae during the fall in ARKANSAS. They were as follows: St. Francis County, 2; White County, 1. This constitutes the first recovery in St. Francis County. The previous record for White County was in 1958. Fall gin trash surveys in LOUISIANA resulted in finding of 3 larvae; 2 in De Soto Parish and one in Sabine Parish. Additional gin trash surveys in states east of the Mississippi River were all negative. In FLORIDA, pink bollworm larvae were recovered from hibiscus blooms in 2 locations on Plantation Key, Monroe County, on July 7. One larva was collected one-half mile south of Coral Shores School and 2 larvae from Plantation Yacht Harbor. These were the first specimens recovered from hibiscus since September 28, 1959, in Florida.

PINK BOLLWORM REGULATED AREAS

MARCH 1, 1961



U. S. DEPARTMENT OF AGRICULTURE

AGRICULTURAL RESEARCH SERVICE

CABBAGE LOOPER (*Trichoplusia ni*) infestations were light to heavy on late cotton in GEORGIA and light and scattered in the northern area of LOUISIANA. They were more numerous than in any past year in ARKANSAS, although few, if any, infestations were economic; however, the increase in numbers on cotton and other crops is of concern in that State. Infestations of several LOOPERS occurred in scattered localities over the cotton belt in TENNESSEE. Controls that were applied were variable in effectiveness, with heavy defoliation occurring in a few scattered fields. Cabbage looper infestations were generally light in TEXAS, with only isolated heavy infestations occurring; and infestations of this pest were present to only a limited extent in OKLAHOMA. Cabbage looper caused considerable damage to cotton foliage in Lea, Eddy and Chaves Counties, NEW MEXICO, with many growers treating. Lighter infestations were found in all other cotton-growing areas of New Mexico. Cabbage looper infestations in ARIZONA were light to medium and were present on cotton statewide throughout the summer, although damage in most cases was considered light. The pest damaged several seedling cotton fields in Nye County, NEVADA, in May and was present in many CALIFORNIA locations. Infestations in California were late in developing, however, and did not reach the level of the previous season. The heaviest populations occurred in the San Joaquin and Imperial Valleys.

YELLOW-STRIPED ARMYWORM (Prodenia ornithogalli) caused some concern in OKLAHOMA for the first time in many years. The infestations were found mainly in the cotton-producing regions of the central and east central areas during June and early July. Only light populations, 2-3 per 250 feet of row, were noted, but a high percentage of the fields surveyed were found to be infested in these areas. WESTERN YELLOW-STRIPED ARMYWORM (Prodenia praefica) was more prevalent than for several years in CALIFORNIA, being a problem in the San Joaquin and Imperial Valleys. Local heavy populations were quite frequent. FALL ARMYWORM (Laphygma frugiperda) defoliated cotton and attacked bolls in Elbert County, GEORGIA; and ARMYWORM (Pseudaletia unipuncta) caused local light damage in CALIFORNIA.

BEET WEBWORM (Loxostege sticticalis) occurred in light populations on cotton in Fresno County, CALIFORNIA; and WEBWORMS (Loxostege spp.) were light in OKLAHOMA cotton during the year. CUTWORMS were of local occurrence and damage was very spotty in CALIFORNIA, but when they did occur, heavy populations were usually present. A heavy infestation of BLACK CUTWORM (Agrotis ipsilon) was reported in the Buttonwillow area of Kern County. Cutworms were light and caused only limited damage in OKLAHOMA. CELERY LEAF TIER (Udea rubigalis) populations were heavy on cotton in the Old River-Shafter area of Kern County, CALIFORNIA, during 1960.

Light infestations of BEET ARMYWORM (Spodoptera exigua) occurred in some central ARIZONA cotton in late April and continued into May. Medium to heavy infestations caused considerable foliage and fruit damage in some areas of Maricopa, Pinal and Yuma Counties during July and August, but damage was not as severe, generally, as in 1959. Medium to heavy populations of SALT-MARSH CATERPILLAR (Estigmene acrea) occurred in cotton in Riverside and Imperial Counties, CALIFORNIA. Other areas of the State had very light populations. In ARIZONA, salt-marsh caterpillar populations began to increase during August, but the buildup was slow and migration of larvae did not begin until late September. Infestations were not as heavy as in 1959.

COTTON LEAFWORM (Alabama argillacea) infestations were noted in only local areas of TEXAS and only an occasional light infestation was reported in Lea, Chaves, Eddy and Dona Ana Counties, NEW MEXICO, with no appreciable damage occurring. Infestations of this pest were more common than in 1959 in OKLAHOMA, but most population buildups did not occur until late in the season and, in most cases, heavy defoliation did not occur until almost harvest time. The main areas infested in Oklahoma were the south central and central sections. Several fields in Caddo Parish, LOUISIANA, were found heavily infested, with larvae ranging from 1-6 per plant in one field. The insect was not a problem in ARKANSAS, although larvae were very numerous in many areas of the State late in the season. Cotton leafworm was reported as far north as Griffin, GEORGIA, on October 20, but since the insect made its appearance after the crop was made, it was of a beneficial nature.

COTTON LEAF PERFORATOR (Bucculatrix thurberiella) infestations began to appear during July in Yuma County, ARIZONA, cotton and became very heavy in August and September. Populations also became high in the central area of Arizona in August and September. Foliage damage was heavy in some areas, particularly in Yuma and Pinal Counties. In CALIFORNIA, medium to heavy populations of cotton leaf perforator began in June and continued through October in Riverside and Imperial Counties. Damage by this insect is limited to the desert areas of California. Also in California, larvae of a PYRAUSTID (Noctuelia rufofascialis) were light in cotton bolls in the Niland area of Imperial County.

STALK BORER (Papaipema nebris) was prevalent in margins of cotton fields in TENNESSEE; and COTTON SQUARE BORER (Strymon melinus) damage was limited on cotton in OKLAHOMA, and was not as extensive as in 1959 in TEXAS. A LEAF ROLLER (Platynota sp., probably rostrana) caused some serious damage to cotton in some areas of Acadia and St. Tammany Parishes, LOUISIANA. Damage to terminals in these parishes ranged as high as 75 percent. Another LEAF ROLLER (Platynota stultana) was light in cotton in some areas of ARIZONA throughout the summer and was locally present in cotton in CALIFORNIA. The pest was not as damaging as past years in the latter State.

Heavy populations of COTTON FLEAHOPPER (Psallus seriatus) and another FLEAHOPPER (Spanogonicus albofasciatus) were present in central and southeast ARIZONA cotton from mid-May until the decline began in mid-June. The buildup was later and not as heavy in Yuma County. S. albofasciatus was predominant in central and southeast Arizona, while cotton fleahopper reached heavy proportions for a short period in the central area. S. albofasciatus was present in small numbers throughout the season in Clark and Nye Counties, NEVADA, and the species damaged squares and caused the loss of the "middle crop" in many cotton fields in southern NEW MEXICO where control measures were not used. Infestations of cotton fleahopper were heavy throughout TEXAS and were heaviest in OKLAHOMA in the southwest and south central areas where the pest caused considerable concern to growers in localized areas during June, July and early August. Cotton fleahopper was light in all other areas of Oklahoma. During July in LOUISIANA, 5 fields of cotton in Evangeline Parish were heavily infested with cotton fleahopper; 2-3 per plant examined.

LEAFHOPPERS were general in CALIFORNIA, but not as abundant or damaging as in past seasons. Heavy infestations of Empoasca spp. occurred earlier than usual in NEVADA. They increased rapidly beginning in July in Clark County, and caused severe "hopperburn" as the season progressed. STINK BUGS were of minor importance in ARIZONA and occurred in local areas of CALIFORNIA, although they were fairly heavy in Imperial County. Euschistus impictiventris and SAY STINK BUG (Chlorochroa sayi) were present in cotton over ARIZONA throughout the summer, particularly in Cochise County, where counts averaged 4 per 100 sweeps in early July. Euschistus conspersus occurred in heavy populations in Fresno County, CALIFORNIA.

LYGUS BUGS (Lygus spp.) were of general occurrence in all cotton-growing areas of CALIFORNIA. Cotton adjacent to alfalfa was more frequently infested and experienced the heavier populations. Suspected resistance to certain insecticides has occurred in several areas within the State. Adult populations of Lygus spp. began increasing in ARIZONA about June 15, although heavy nymphal populations were not present until mid-July. Infestations remained high throughout the summer in Arizona until cotton began to "cut out" in September, with counts averaging from 10-40 per 100 sweeps in untreated fields. Economic populations were present in Nye County, NEVADA, starting in late June, and continued through the season. Insecticide applications assisted in holding lygus bugs in check. In Clark County, they were not a problem and no insecticides were applied. Damage by these pests caused loss of the "middle crop" in many southern NEW MEXICO cotton fields where control measures were not used. However, only limited damage occurred in OKLAHOMA and infestations of TARNISHED PLANT BUG (Lygus lineolaris) were generally light in LOUISIANA. Several species of PLANT BUGS were present in cotton in ARKANSAS during the year, with tarnished plant bug being by far the most important species. The percent of fields infested with all species of plant bugs in Arkansas ranged from 8.3 to 57.0 from the fourth week of June to the first week of September. The highest counts were in June and July.

COTTON APHID (Aphis gossypii) infestations in GEORGIA were light to heavy in seedling cotton and on older cotton later in the season; however, most infestations were light to moderate in the latter instance. Populations were of some concern in isolated areas of TEXAS, and only light infestations were reported in a small percentage of the fields surveyed in OKLAHOMA. Cotton aphid was generally low in ARKANSAS, with many fields having such low numbers that prey was scarce for lady beetles. This resulted in low lady beetle populations, a condition very similar to that of 1959. Light cotton aphid infestations were present in the central and southeastern areas of ARIZONA in April and May and populations built up during the latter part of September through November in cotton in Dona Ana, Luna and Hidalgo Counties, NEW MEXICO. Honeydew was a problem in several New Mexico fields. Cotton aphid was generally low in CALIFORNIA, with only an occasional infestation requiring control. Kings County reported generally heavy infestations.

The worst outbreak of APHIDS on cotton occurred in NORTH CAROLINA in 1960. *Aphis craccivora* attacked the terminal growth of plants and reduced the growth, while the two leaves on each side of the plant continued to grow, causing a plant with "elephant ears". Cotton aphid feeds generally over the plants. Not all fields of cotton were attacked in North Carolina, but infestations were reported throughout the cotton-growing areas, setting growth back 2 or 3 weeks in the infested plants.

WHITEFLIES were present in CALIFORNIA, but were a problem only in Imperial County where light to medium populations required treatment. Infestations in NEVADA were generally light, with populations increasing and causing honeydew in some fields in Nye County in July and August.

THRIPS were present in cotton, generally, in CALIFORNIA and occurred over a long period, but were usually light. Heavy infestations, averaging 4-8 per plant, occurred in conjunction with cool weather during late April and May in central and southeast ARIZONA. Plant growth was very slow during this period and terminal foliage damage was evident, particularly in the southeastern counties of the State. Higher temperatures during the second week of May resulted in low populations in Arizona by the middle of the month. Thrips were also a major early season cotton pest throughout most cotton-growing areas of NEW MEXICO. They severely damaged cotyledons and about the first 6 true leaves. During the first 2 weeks of May, counts ran as high as 50 per seedling in many New Mexico cotton fields. Infestations of *Frankliniella* sp. were generally light in OKLAHOMA, with only a limited number of isolated fields having heavy to severe populations; however, infestations of *Frankliniella* sp. varied over TEXAS, with heavy populations being present in the north central and central areas. Thrips infestations in LOUISIANA were generally light and infestations in ARKANSAS were heavier than in past years in some cases. They heavily damaged seedling cotton in scattered fields across TENNESSEE, with most fields recovering, although the plants were retarded. The infestations in Tennessee were the worst experienced in at least 10 years. Thrips infestations in GEORGIA were light to heavy, with most infestations being of a moderate nature.

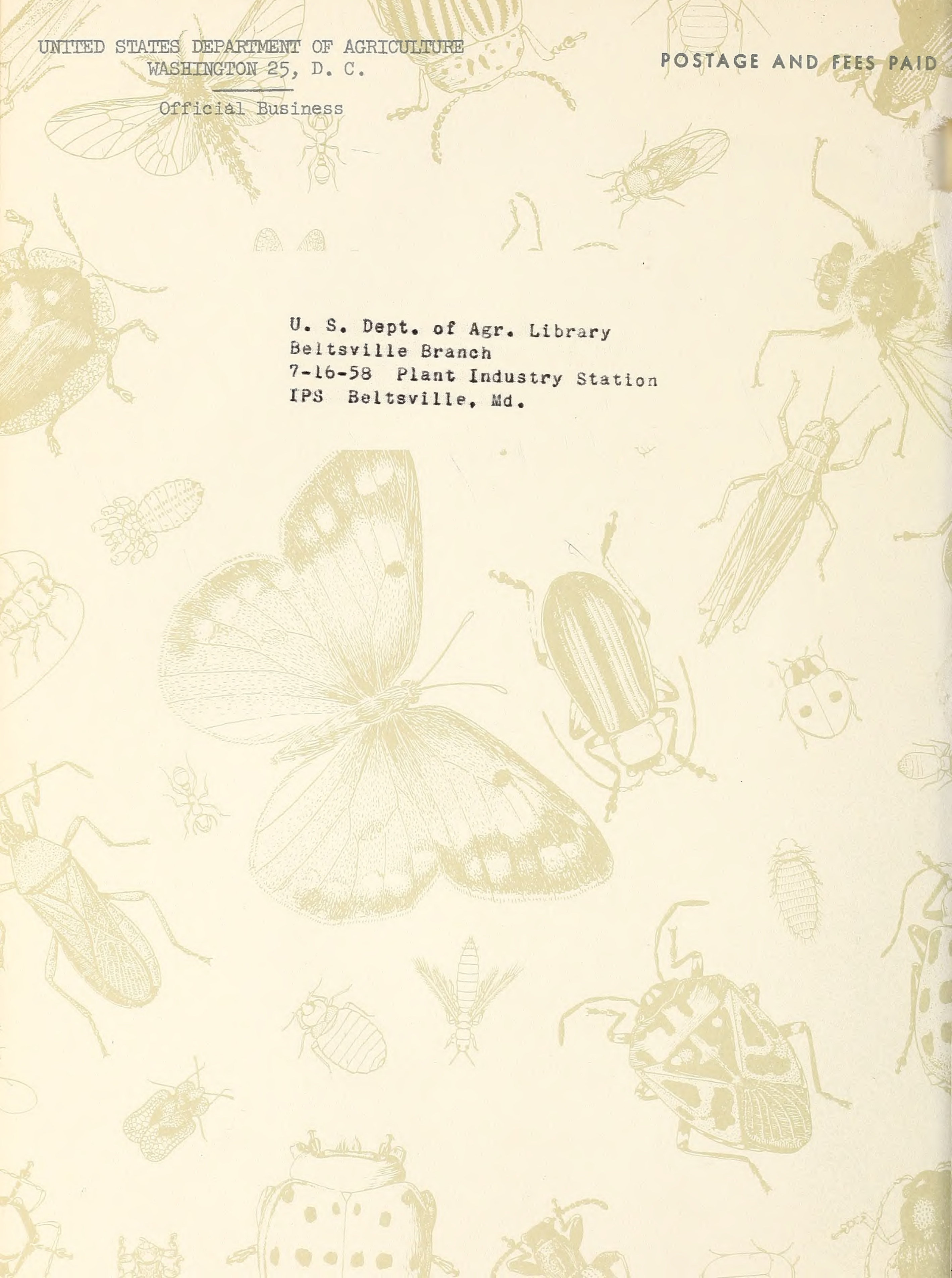
MITES in general were slow in building up in CALIFORNIA. Cotton in the Imperial Valley had fairly heavy infestations in May, while the more northern counties were much later. Fairly normal populations of mites developed during the summer in California. TWO-SPOTTED SPIDER MITE (*Tetranychus telarius*) developed moderate to heavy populations on cotton in Kern and other San Joaquin Valley counties. A late buildup of SPIDER MITES occurred in isolated cotton fields throughout southern NEW MEXICO, and *T. cinnabarinus* was locally heavy in some areas of central and southwest ARIZONA during July and later months. Infestations of *Tetranychus* spp. were heavy on some seedling fields in Nye County, NEVADA, during May and were light to heavy, though spotty, in several fields in July and August. Only limited damage to cotton by *Tetranychus* spp. occurred in OKLAHOMA, and infestations of spider mites were much lighter in 1960 than during the past 2 years in ARKANSAS. Infestations also were generally light in LOUISIANA. In TENNESSEE, spider mites were a problem in scattered areas of the cotton belt, with several species being involved. Less trouble occurred in 1960 than in the previous 2-3 years, however. Spider mites were generally controlled in Tennessee, with little or no loss of the crop resulting. Infestations of *Tetranychus* spp. and DESERT SPIDER MITE (*T. desertorum*) were light to moderate during 1960 in GEORGIA.

FIELD CRICKETS occurred in heavy populations in cotton plantings in September and October in Imperial County, CALIFORNIA.

Addendum to List of States and Individuals Who Submitted Summaries

WASHINGTON - C. A. Johansen

Note: The Cereal and Forage Insect portion of the Washington summary will be carried as a special section in the Cooperative Economic Insect Report after the National Summary has been completed.



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